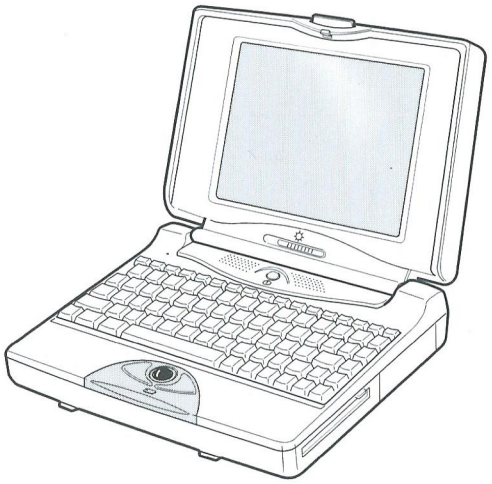
User's Guide

SENS 800



SAMSUNG

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SAMSUNG SENS 800
Notebook Computer
User's Guide

IMPORTANT SAFETY INSTRUCTIONS

Read all of these instructions. Save these instructions for later use.

- Follow all warnings and instructions marked on the product.
- Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- Do not use this product near water. Never spill liquid of any kind on the product.
- Do not place this product on an unstable cart, stand, or table.
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
- Operate this product using the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
- Do not allow anything to rest on the power cord.

- Do not place this product in a location where someone may trip over the cord.
- If an extension cord is used with this product, make sure it is a 3-wire grounded cord and that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
- Never push objects of any kind into this product through the cabinet slots, as they may touch dangerous voltage points or short out parts; that could result in a risk of fire or electric shock.
- Except as explained elsewhere in this manual, do not attempt to service this product yourself.
- Do not install or remove the removable hard disk drive with the notebook turned on.
- Handle the removable hard disk drive and battery with care. If dropped, they may be damaged.
- Do not allow the battery to be exposed to direct sunlight for extended periods of time.
- Do not attempt to disassemble the battery. The chemicals contained within it can cause injury to skin or eyes.
- Do not expose the battery to moisture or chemicals.
- Charge the battery only as described in this document.
- Do not short circuit the battery terminals as the resulting high currents can damage the battery.
- The battery should not be used to power other products.
- Do not dispose of a used battery in a fire or incinerator, as an explosion may result. The battery should be recycled.
- Do not subject the battery to temperature extremes. Battery temperature should not be less than -20° C or greater than 50° C.

- Unplug this product from the wall outlet and refer problems to the service representative under the following conditions:
  - When the power cord or plug is damaged or frayed.
  - If liquid has been spilled into the product.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions are followed, adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage.
  - If the product exhibits a distinct change in performance.

Battery Disposal

Warning **Do not put rechargeable batteries or products powered by non-removable rechargeable batteries in the garbage.**

Contact your customer service representative for information on how to dispose of batteries that you cannot use or recharge any longer.

Consider local regulations when discarding old batteries.

FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO FREQUENCY INTERFERENCE STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet helpful: "Something About Interference." This is available at FCC local regional offices. The SAMSUNG Electronics Co., LTD is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by SAMSUNG Electorincs Co., LTD. The correction will be the responsibility of the user. Use only shielded data cables with this system.

CANADIAN RADIO INTERFERENCE REGULATIONS

This apparatus does not exceed the class B limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Le présent appareil n'émet pas de bruits radioélectriques dépassant les limites applicable aux appareils digitals de la classe B prescrites par le règlement de brouillage radioélectrique dicté par le Ministère des Communictions du Canada.

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About this Manual/Product

Purpose

This document provides you with all the information you need to use your SENS 800 Notebook Computer. Use this manual when you want to customize your notebook's features, to trouble shoot your notebook should problems occur, or for detailed information about your notebook.

Note The description of this User's Guide is based on the TFT Model (Model T). The features specific to STN Model (Model C) are shown where there are differences from Model T.

Conventions

This SENS 800 User's Guide uses the following conventions:

[F1]

A letter, number, symbol, or word enclosed in square brackets and printed in bold type represents a key on your keyboard. For example the instruction:

Press **[F1]**

means press the key labeled "F1" on your keyboard.

[Ctrl] + [Alt] + [Del]

Two or three key names with a plus sign between them indicate multiple key entries. For example:

Press **[Ctrl] + [Alt] + [Del]**

means that the keys marked "Ctrl", "Alt", and "Del" must be simultaneously pressed.

KB

A KB suffix to a numerical value indicates size in kilobytes. For example: 512 KB.

MB

An MB suffix to a numerical value indicates size in megabytes. For example: 8 MB.

SENS 800 Release Notes

Some important information may not be available at the time this manual is printed. If applicable, new information is included in Release Notes in your notebook package.

Quick Start

This Quick Start chapter provides the essentials needed to get your SENS 800 Notebook computer up and running quickly. Refer to the other chapters in this user's guide for full details.

Unpack

Unpack the contents of the SENS 800 box. The box contains the following items:

- SENS 800 notebook computer
- AC Adapter and AC Power Cord
- Carrying Case
- Rechargeable Battery
- User's Guide
- Removable HDD Pack

Selecting a Safe Environment

Although designed for portable operation, we recommend careful handling of this notebook computer. Use the following guidelines when using your notebook:

1. Avoid using the notebook near excessive dust, moisture, electromagnetic fields or heat.
2. Avoid situations where liquids may be spilled onto the notebook.
3. Remove all objects from the keyboard before closing the lid.

Battery

Installing the Battery

This chapter details how to install the battery with the notebook turned off.

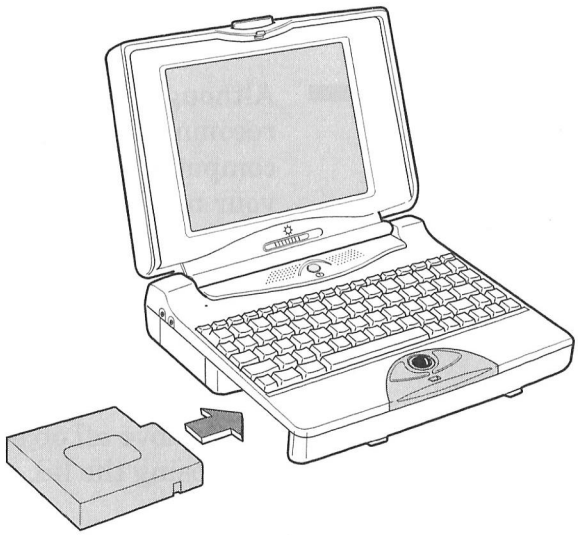
Note For details on how to install the battery with the notebook turned on, refer to the Hot Replacement section in Chapter 2.

Use the following steps to install the battery:

1 Remove the battery from its shipping bag.

2 Slide the battery into the notebook (the terminal end must go in first) until it clicks into place (Figure 1).

Figure 1. Installing the Battery



Charging the Battery

To charge the battery, connect it to the AC adapter.

When the notebook is powered off, the battery charging time is approximately 2 hours. When the notebook is powered on, the battery charging time is approximately 6 hours.

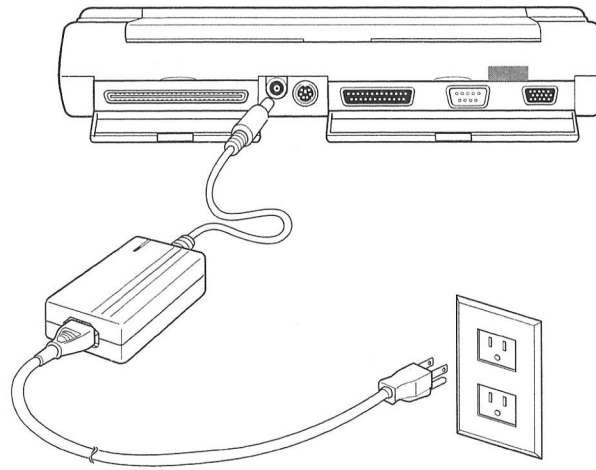
Connecting the AC Adapter

Use the following steps to connect your notebook to AC power:

1 Unwrap the AC Adapter and AC power cord. Connect the DC power cable from the AC Adapter to the DC-In connector on the back of the notebook.

2 Plug the AC Power cord into a grounded AC wall outlet.

Figure 2.
Connecting the AC Adapter



The green power LED indicator on the AC Adapter lights when the AC Adapter is receiving power from the AC wall outlet.

Note Refer to Chapter 2 for detail informations.

Turning On the Notebook

Use the following steps to turn the notebook on:

1 The power switch is located above the keyboard. Push in the power button to turn the notebook on. After a few seconds, the Self Test screen is displayed.

2 Adjust the brightness control as necessary to obtain a satisfactory screen display on the LCD.

Software

Your notebook includes system operating software which allows you to start working with your notebook immediately. This includes the operating system environment as well as numerous utilities specifically designed for the notebook. The following software is provided on your notebook:

- MS-DOS
- MS-DOS On-Line Documentation
- Microsoft Windows (Optional)
- Microsoft Windows On-Line Documentation (Optional)
- SENS 800 Specific Software (Video/Audio Drivers and Utilities)
- PCMCIA Card and Socket Services Software

SENS 800 Release Notes

Some important information may not be available at the time this manual is printed. If applicable, new information is included in Release Notes in your notebook package.

Trackball

The 19mm built-in trackball performs all standard mouse functions for Windows applications. It is positioned in a comfortable location below the keyboard. Its major advantage over the standard mouse is that it does not require flat surface space. Simply roll the ball to move the cursor and press the left or right buttons to make selections.

Cursor Key

The cursor keys are located in the lower right corner of the keyboard. They move the cursor one space or line at a time. They do the following:

[←]	Moves the cursor left one space.
[→]	Moves the cursor right one space.
[↓]	Moves the cursor down one line.
[↑]	Moves the cursor up one line.

Control Keys (Hot Keys)

Hot Keys provide specific functions. In order to execute the Hot Keys, you must press the **[Fn]** key while simultaneously pressing another key.

Keys	Description
[Fn] and **[Speed]**	Toggles the system power management function enable or disable.
[Fn] and **[Reverse]**	Toggles the video display between normal and reverse video mode.
[Fn] and **[Backlit]**	This turns the LCD backlight off. Pressing any key turns the backlight on. Significantly less power is used when the LCD backlight is off.
[Fn] and **[CRT/LCD]**	Switches the video display between LCD, external CRT or both.
[Fn] and **[Gauge]**	The system displays a picture which indicates the amount of remaining battery power and the current power management setting.
[Fn] and **[KeyLock]**	Locks the keyboard and activates the password.
[Fn] and **[Mute]**	Toggles the audio output enable or disable.
[Fn] and **[REST]**	Transitions the system to the REST state.
[Fn] and [↓]/[↑]	Change the current audio output volume level.

Note Refer to Chapter 2 for details.

Maximizing Battery Operation Time

The following techniques can be used to improve the amount of time your notebook operates from battery.

- Begin portable notebook operation with a fully charged battery.
- Enable Power Management using the setup function to set the power saving level.
- Use the minimum LCD brightness setting.

REST

REST conserves the notebook's power consumption. There are three methods of activating REST:

Automatic	If the notebook remains idle for a prolonged period of time, the notebook automatically enters the REST state. The amount of time the notebook must remain idle before entering REST is established through Setup.
Manual	Press **[Fn]** + **[REST]** to place the notebook in the REST state.
Battery Low	The notebook automatically enters REST when the battery power becomes low.

Note Refer to Chapter 4 for full details.

Resuming from REST

To resume the notebook from REST:

- Press the space bar or On/Off button (depending on how the SENS 800 entered the REST state).

The notebook conducts a battery check on resume. If the battery power is sufficient, the notebook is resumed. However, if the battery power is low, the notebook is returned to the REST state.

Note Refer to Chapter 4 for full details.

System Description

This chapter describes the features of the SENS 800 SAMSUNG Notebook Computer. For details on how to use these features, refer to Chapter 2.

Introduction

The SENS 800 is an AT compatible notebook with powerful Intel® Pentium P54C performance. It provides the power and performance of a desktop system in a lightweight and portable package.

The SENS 800 is available in two models (Model C and Model T). These models are the same, except for the items listed in Table 1-1.

Table 1-1. SENS 800 Models

Feature	Model C	Model T
LCD	Passive Color DSTN	Active Color TFT
Weight	6.1 pounds	6.2 pounds

Features

The notebook contains the following standard features:

- Intel Pentium P54C-75MHz / P54LM-90MHz Processor with 16KB Internal Cache
- 256KB External Cache
- Removable Hard Disk Drive (HDD)
  - ***LBA*** mode support

- High Performance Video
  - 32 Bit VESA Local Bus
  - 1 MB Video DRAM
  - Simultaneous LCD/CRT Display
  - VGA on LCD and External CRT
  - Integrated Liquid Crystal Display (LCD)
- Digital Audio Recording and Playback Support
  - SoundBlaster 2.01 compatible
  - FM synthesizer (Yamaha YMF3812 register compatible)
  - Internal Microphone and External Condenser Microphone
  - Internal Mono Speaker and External output support for Headphone
- Supports ***ECP*** and ***EPP*** parallel port modes
- Portable Pointing Devices
  - 19mm Integrated Trackball (PS/2 type)
- Standard Connectors
  - 9 Pin Serial Port Connector
  - IR (Infrared) Port
  - 15 Pin Port for Connecting an External CRT Display
  - 25 Pin Port for a Parallel Device
  - 6 Pin Connector for a PS/2 compatible keyboard, Pointing device or Numeric keypad
  - 200 Pin Expansion Port
- Security
  - Removable Hard Disk Drive
  - Keyboard Protection
  - System Password Protection

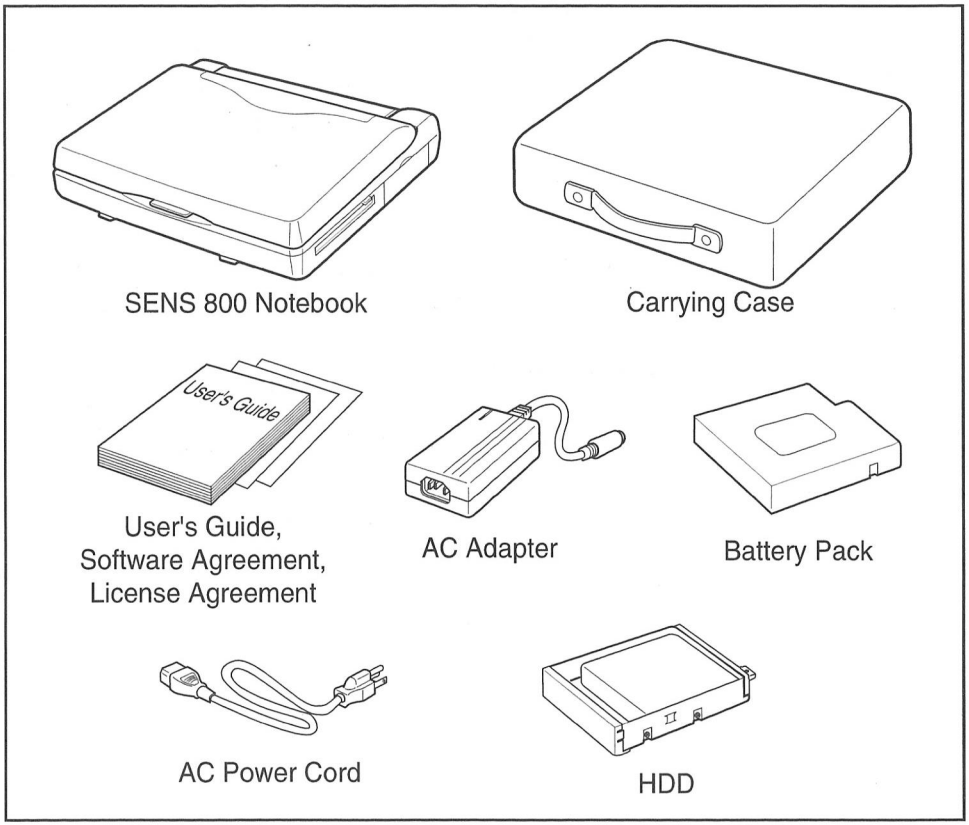
- Personal Computer Memory Card International Association (PCMCIA) PC Card Standard Type 2.0 Slots (1 Type II and 1 Type III)
- 8 MB Dynamic Random Access Memory (DRAM) Upgradeable to 40MB
- Integrated 3.5" Floppy Disk Drive (FDD)
- 84 Key Internal Keyboard
- Nickel Metal Hydride (NiMH) Battery Pack
- AC Adapter and Power Cord
- Light Emitting Diodes (LED) Indicating Notebook Status

Components

The shipping box contains all of the items illustrated in next page Figure 1-1.

- SENS 800 notebook computer
- AC Adapter and AC Power Cord
- Carrying Case
- Rechargeable Battery
- User's Guide
- Removal HDD Pack

Figure 1-1. Components



Removable HDD

The notebook has been designed so that the Hard Disk Drive can be easily removed and installed without special tools. Enclosed in a case for protection, the Hard Disk Drive slides in and out of a special bay. This feature allows you to easily upgrade to higher storage capacities.

Note For security, the HDD can be locked to the notebook by a screw which is located under the keyboard.

High Performance Video

Local Bus

32 bit Local Bus technology has been used to provide outstanding video performance (screen refresh, scrolling, painting, etc.). Local Bus, a feature of the Intel Pentium P54C processor, provides a high speed data path between the video subsystem and the processor. It provides superior performance over systems that only use the AT bus.

Simultaneous Display

Both the LCD and External CRT can simultaneously display the same images. This is useful during presentations where either an external CRT or overhead projection device is used.

Super VGA

Super VGA support (1024 x 768 maximum) is available when using the notebook with an external CRT.

Integrated LCD

The color LCD screen supports up to 256 colors in certain graphics modes. In the 640x480 mode, up to 64K color modes are supported by the VGA circuitry.

The LCD screen can display the following video modes:

- Video Graphics Array (VGA)
- Enhanced Graphics Adapter (EGA)
- Color Graphics Adapter (CGA)
- Monochrome Display Adapter (MDA)

Note Due to the characteristics of the liquid-crystal material, the contrast of the LCD screen may vary with ambient temperature, light and viewing angle.

Power

The notebook must be powered by one of the following:

- AC Adapter
- Battery Pack
- Optional Automobile Cable
- Optional Cable Master II

Note Refer to Appendix A for details on the optional Automobile Cable and Cable Master II.

AC Adapter

The AC Adapter converts AC power to DC power and supplies DC power to the notebook. The adapter automatically adjusts itself to a wide range of AC voltage input (110 to 240 volts, 50/60 Hz). AC power either charges the battery or powers the notebook.

Battery

If the AC Adapter is not plugged in, the battery provides power to the notebook. If the AC Adapter is plugged in, it recharges the battery pack as follows:

- When the notebook is Off or in the REST state, the battery is rapid charged.
- When the notebook is On, the battery is standard charged.

Hot Battery Replacement

The Hot Replacement feature permits you to replace the battery without having to power down your notebook. This is accomplished by placing your notebook in the REST state, then changing the battery.

Note Refer to Chapter 2 for details.

Trackball

Some applications and operating environments, such as Microsoft Windows, work best with a pointing device. The 19mm built-in trackball performs all standard mouse functions for Windows applications. It is positioned in a comfortable location below the keyboard. Its major advantage over the standard mouse is that it does not require flat surface space. Simply roll the ball to move the cursor and press the left or right buttons to make selections.

Controls, Indicators and Connectors

The following section contains figures and corresponding tables detailing the connectors and indicators on each side of the notebook.

Figure 1-2. Controls, Indicators and Connectors (front)

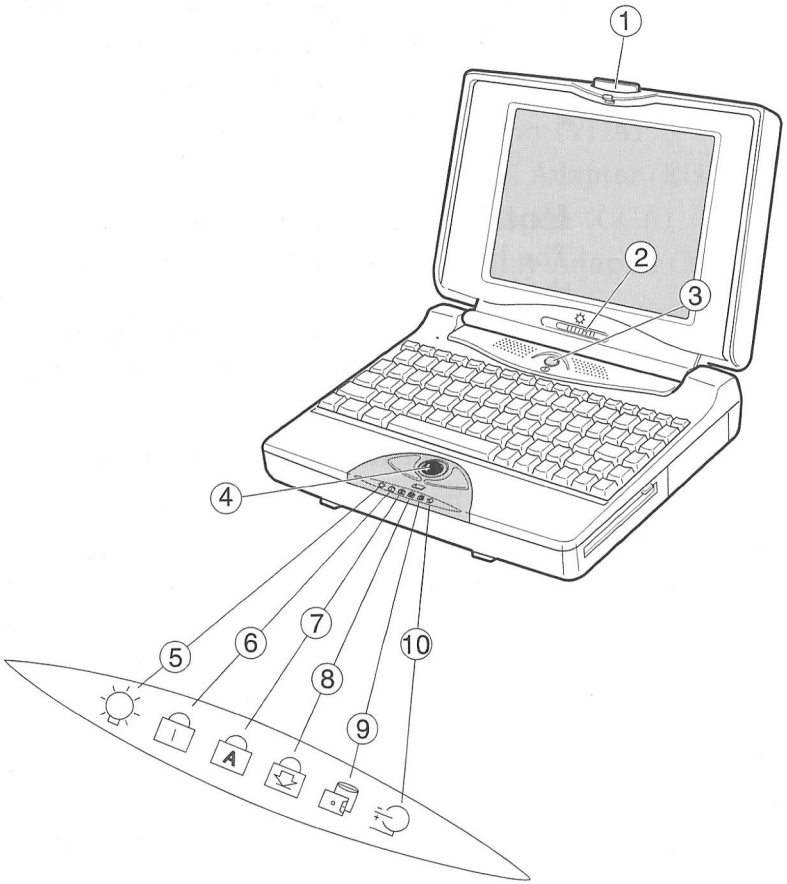


Table 1-2. Controls, Indicators and Connectors (front)

Item	Description
1	LCD release latch which opens the notebook.
2	Adjusts the LCD backlight brightness. If your notebook is Model C, the contrast control knob is located at the left side of brightness control.
3	Power button used to turn the notebook on, off and returns the system from REST state.
4	Integrated trackball which performs all standard mouse functions.
5	Lights when the notebook is on.
6	Lights when number lock is on.
7	Lights when caps lock is on.
8	Lights when scroll lock is on.
9	Amber - Indicates that the FDD is being accessed. Green - Indicates that the HDD is being accessed.
10	Amber - Indicates that the battery is receiving a normal charge. Green - Indicates that the battery is being trickle charged to maintain the battery power.

Note The Model T does not have contrast control.

Figure 1-3. Controls, Indicators and Connectors (back)

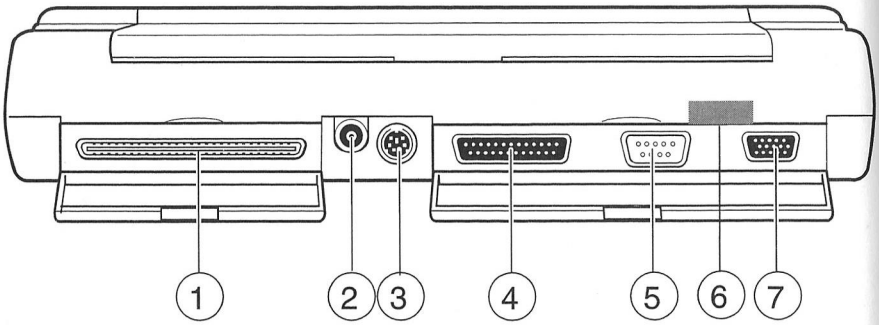


Table 1-3. Controls, Indicators and Connectors (back)

Item	Description	Pins
1	Expansion Port	200
2	DC-In Connector	1
3	PS/2 External Keyboard or Mouse	6
4	Parallel Port	25
5	Serial Port	9
6	IR(Infrared) Port	
7	External CRT Display Connector	15

Figure 1-4. Controls, Indicators and Connectors (left)

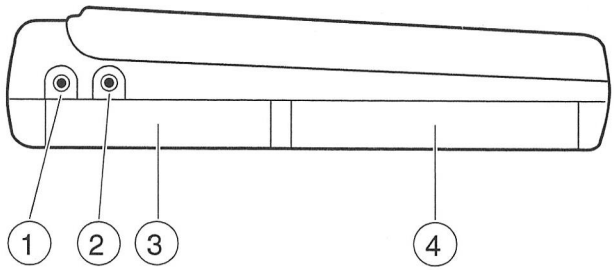


Table 1-4. Controls, Indicators and Connectors (left)

Item	Description
1	Headphone Jack
2	External Condenser Microphone jack
3	HDD Compartment - The HDD can be easily removed and replaced.
4	Battery compartment.

Figure 1-5. Controls, Indicators and Connectors (right)

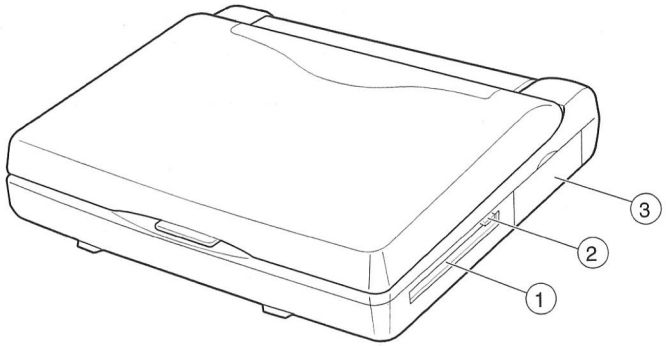


Table 1-5. Controls, Indicators and Connectors (right)

Item	Description
1	Floppy Disk Drive (FDD) compartment.
2	FDD Release - releases the diskette from the drive.
3	PCMCIA card Type II and Type III slots. A Type III card can be inserted into the upper slot and Type II into the lower slot.

Digital Audio

SENS 800 notebook supports Digital Audio for MS-DOS and Windows. This Audio subsystem provides digital sound record and playback. The internal Microphone can record the digital sound with maximum 44KHz sampling rate. The speaker jack supports an external speaker with amplifier or a headphone. To learn the details refer to the Chapter "Software and Utilities". Audio subsystem include the Yamaha YMF3812 (OPL2) register compatible FM synthesizer logic.

This notebook provides internal condenser Microphone and internal mono speaker. The specifications of audio system is as follows:

- SoundBlaster version 2.01 compatible
- Windows Sound System support
- FM synthesizer include (Yamaha YMF3812 register compatible)
- MIDI file playback at windows environment
- Maximum mono, 8-bit, 44.1KHz sampling rate support

Note Only stereo plug is supported for the external microphone and headphone jacks. If mono plug is connected, the notebook will not work properly.

PCMCIA

This notebook provides two industry standard 68 pin Personal Computer Memory Card International Association (PCMCIA) slots. One slot conforms to type II specifications and the other slot conforms to type III mechanical specifications.

The slots support SRAM, Flash memory and ROM cards. In addition, they support PCMCIA I/O cards such as modems, LAN adapters, or pagers. The type III slot also supports fixed disks in the type III PCMCIA form factor.

PCMCIA I/O cards must conform to the PCMCIA PC Card Release 2.0 hardware and software interface specification to operate properly. Refer to Chapter 5 for detailed PCMCIA information.

Memory

The notebook contains 8 MB of memory and can be expanded to 40MB of main memory. Refer to Appendix A for details on optional expansion memory cards.

Optional Features

You can purchase and add the following optional features to your notebook:

- 8 MB, 16 MB ,32 MB Memory Expansion Cards
- Additional Battery Packs
- Cable Master I
- Cable Master II
- External Charger
- Automobile Cable

Note For details on optional components, refer to Appendix A.

Getting Started and Operating the Notebook

This chapter describes how to set up and use your notebook.

Installing the Battery

The battery can be installed with the notebook turned on or off. This section details how to install the battery with the notebook turned off.

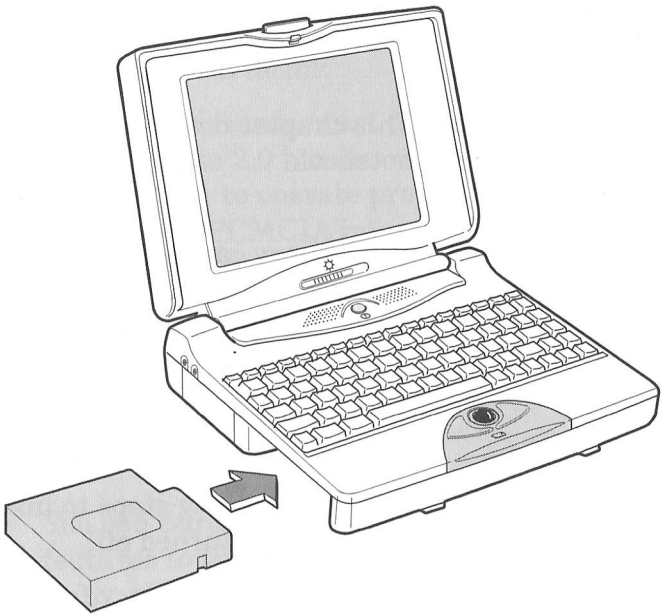
Note For details on how to install the battery with the notebook turned on, refer to the Hot Replacement section of this chapter.

Use the following steps to install the battery with the notebook turned off:

1. Remove the battery from its shipping bag.
2. Slide the battery into the notebook until it clicks into place (Figure 2-1).

Note The battery should be fully charged prior to portable use. Refer to the Battery section of this chapter for details on charging the battery.

Figure 2-1. Installing the Battery



Connecting the AC Adapter

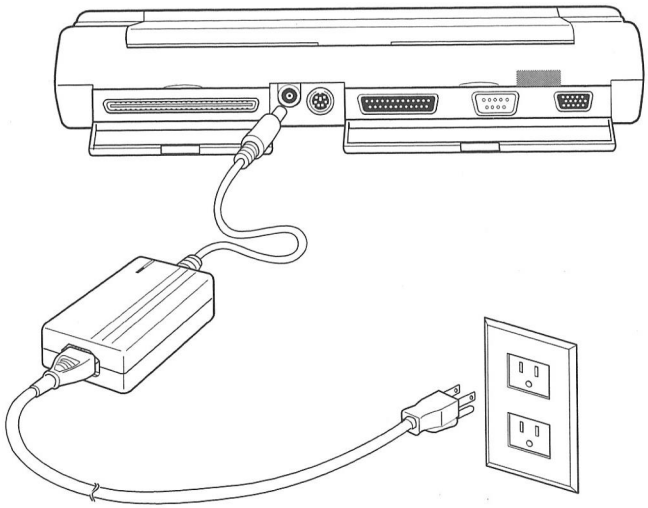
Use the following steps to connect AC power to the notebook.

1 Unwrap the AC Adapter and AC power cord. Connect the DC power cable from the AC Adapter to the DC-In connector on the notebook (Figure 2-2).

2 Plug the AC Power cord into a grounded AC wall outlet.

The green power LED indicator on the AC Adapter lights when the AC Adapter is receiving power from the AC wall outlet.

Figure 2-2.
Connecting the AC Adapter



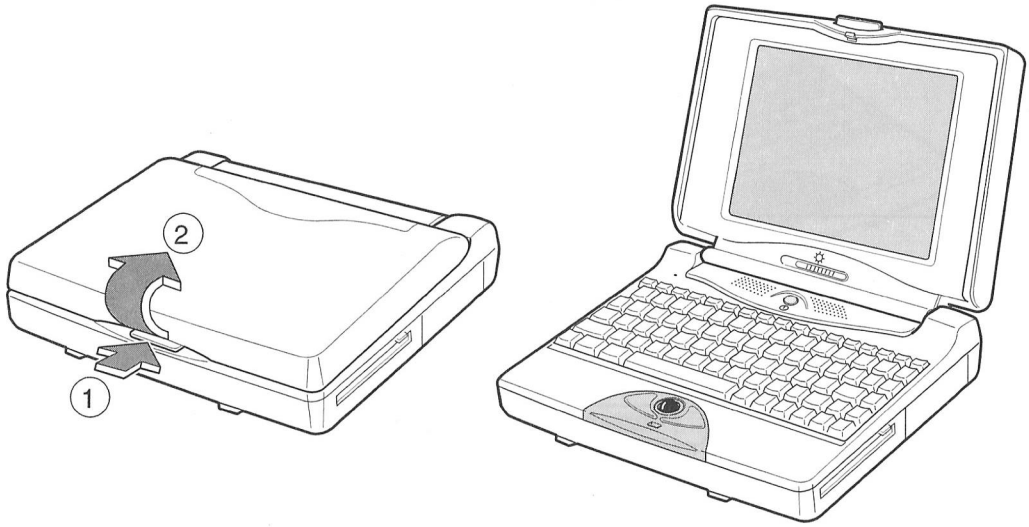
Opening the LCD

Use the following steps to open the LCD.

1 With the front of the notebook facing you, push in the front latch and raise the LCD (Figure 2-3).

2 Tilt the LCD to a comfortable viewing position.

Figure 2-3. Opening the LCD



Peripheral Devices

Use the following steps to connect any external peripheral devices you may have.

1 If the external peripheral device is on, turn it off.

2 If the notebook is on, turn it off.

3 Open the door on the back of the notebook.

4 Connect the peripheral device to the notebook (refer to Chapter 1 for details on peripheral device connectors).

5 Turn on the external peripheral device.

6 Turn on the notebook by pressing the power button located above the keyboard.

Warning **Avoid excessive force when opening the doors and connecting peripherals.**

Turning the Notebook On and Off

Turning On the Notebook

Use the following steps to turn on your notebook.

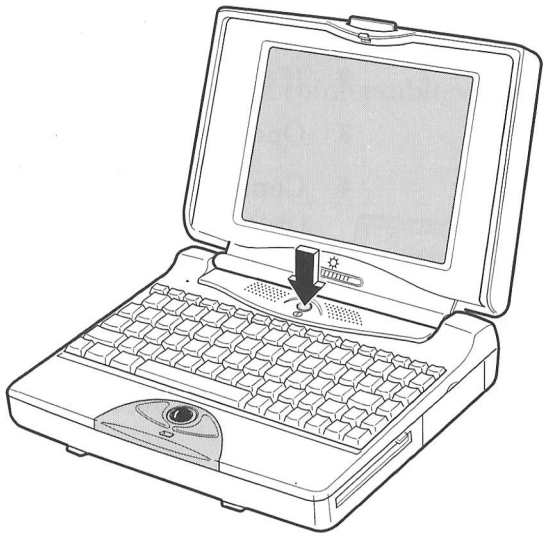
1 Power your notebook (AC Adapter or battery) and connect all peripheral devices (if any).

2 Turn on your notebook by pressing the power button located above the keyboard.

When you turn the power on, the notebook automatically performs a POST(Power On Self Test). When the test completes successfully, the notebook loads the operating system from the HDD or FDD.

Adjust the LCD's brightness control to a comfortable level.

Figure 2-4. Turning the Notebook On and Off



Turning Off the Notebook

Use the following steps to turn off the notebook.

Warning **Failure to perform the following steps may result in lost data.**

1. Save all data and Exit your current application.
2. If the notebook is not at the MS-DOS prompt, return the system to the MS-DOS prompt.
3. When the screen shows the MS-DOS prompt such as C:\, turn off the notebook by pressing the power button located above the keyboard.

Note If you want to turn on the power again, wait at least 10 seconds after power off.

Setting the Hibernation feature

Hibernation is new technology that can maximize the battery life of your SENS 800 Notebook Computer. It automatically turns off all system power while you are not using the notebook. However, before turning itself off, Hibernation saves all information currently in its memory and stores it in a special location on your hard disk drive. When you start using the notebook again, Hibernation returns you to the same place you were before stopping.

To install the Hibernation feature, install the system utility SUSTODSK.EXE.

Caution: Installing the Hibernation feature will destroy previously saved data on your disk, so back up your hard disk before installing Hibernation. Please refer to SUSTODSK.EXE for more detailed information.

Trackball

The 19mm built-in trackball performs all standard mouse functions for Windows applications. It is positioned in a comfortable location below the keyboard. Its major advantage over the standard mouse is that it does not require flat surface space. Simply roll the ball to move the cursor and press the left or right buttons to make selections.

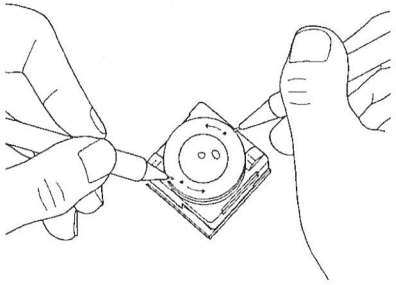
Cleaning the Trackball

In case the trackball has its mechanical part contaminated with dust or oil, the cursor may be structurally influenced and begin to move abnormally. When such abnormal movement are observed, follow the instructions below to clean the trackball. It is recommended cleaning should be done every month.

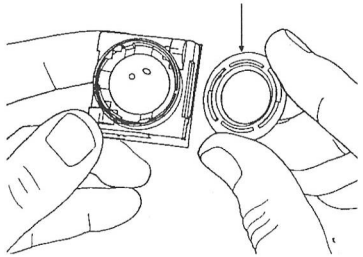
Warning **When cleaning the trackball turn off the notebook.**

1 Things needed for cleaning
- Dry cloth, Cotton swab
- Water or Alcohol, Head cleaner

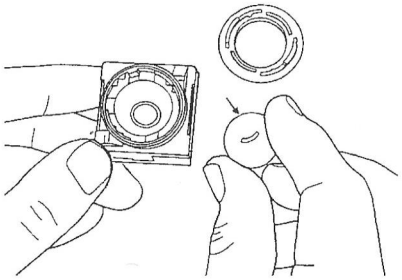
2 Put the tip of a mechanical pencil in each of two guide hole of the retainer ring and rotate it counterclockwise until its unlock.



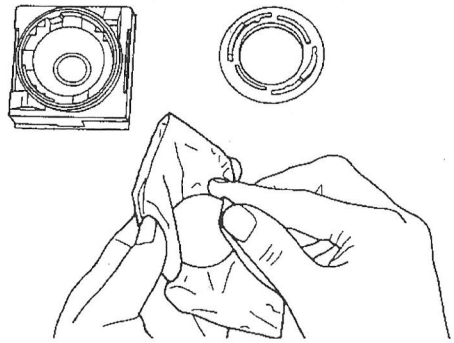
3 Remove the retaining ring.



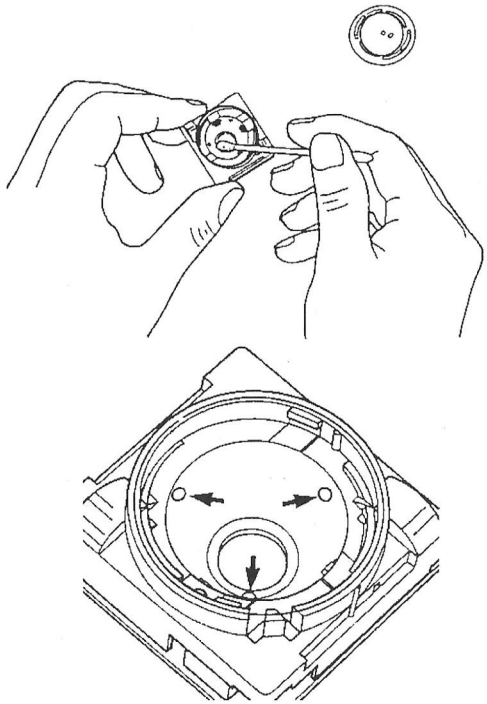
4 Take out the ball.



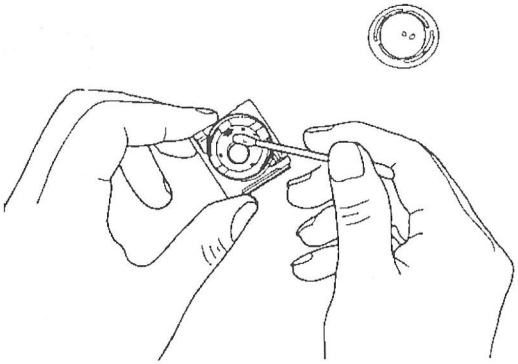
5 Wipe the ball with dry cloth to clean off oil, finger prints and so on.



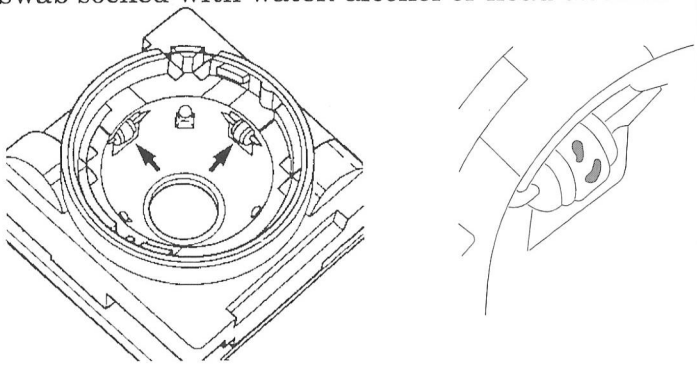
6 The ball supporting parts (tiny balls) placed at three points shall be cleaned with cotton swab.



7 Clean the rubber rollers set at two points with a cotton swab socked with water.



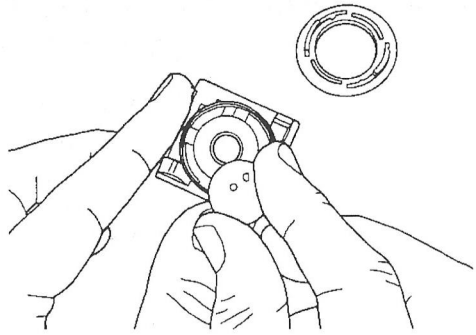
8 In case water cannot clean it up, use a cotton swab socked with water. alcohol or head cleaner.



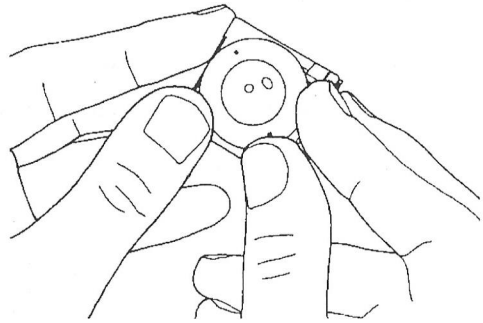
Note

1. When water, alcohol or head cleaner is used, avoid excessive use and take care they should not flow inside the trackball.
2. Refrain from using other kinds of solvent except water, isopropyl alcohol or head cleaner, because they may deteriorate the rubber.
3. Do not apply too much force in cleaning so that the roller will not be out of position.

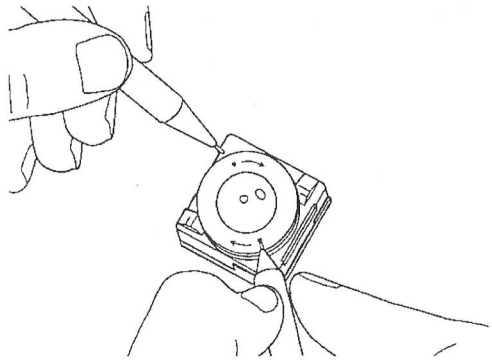
9 Replace the ball in the trackball bodv.



10 Replace the retaining ring.



11 Put the tip of a mechanical pencil in each of the two guide holes of the retainer ring and rotate it clockwise until it is locked.

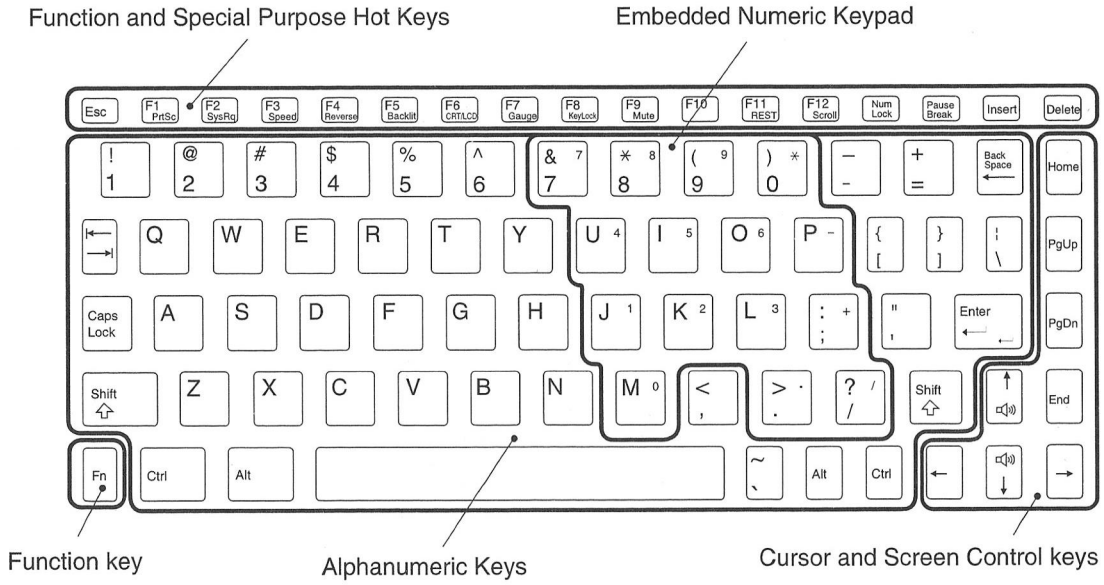


Keyboard

The keyboard (Figure 2-7) features the following:

- IBM 101/102 Key Keyboard Compatibility
- 12 Function Keys
- Embedded Numeric Keypad
- Cursor Control Keys
- Hot Keys

Figure 2-7. Keyboard



Cursor Control

The cursor keys are located in the lower right corner of the keyboard. When the keys are in cursor mode, they move the cursor one space or line at a time. They have the following:

[←] Moves the cursor left one space.
[→] Moves the cursor right one space.
[↓] Moves the cursor down one line.
[↑] Moves the cursor up one line.

Embedded Numeric Keypad

The embedded numeric keypad emulates the numeric keypad typically found on a full size 101 key keyboard.

Press the **[Num Lock]** key to toggle the numeric keypad between ON and OFF. The Num Lock LED lights when Num Lock is ON.

- When Num Lock is ON:
  - The keys displayed in the upper right corner of the numeric keypad (see Figure 2-7) are enabled. For example, to generate a "4" press the **[u]** key.
  - The regular keyboard keys of the numeric keypad can be temporarily enabled by simultaneously pressing the **[Fn]** key. For example, to generate a "u" press **[Fn] + [u]** .
- When Num Lock is OFF:
  - The cursor control keys become active when **[Fn]** and a numeric keypad key are simultaneously pressed. For example, to generate a "left cursor key" press **[Fn] + [u]**.

Function Keys

Some special keys have been established to perform important tasks when pressed and held with the **[Fn]** key.

[Fn] + [Speed] Toggle the system power management function enable or disable.

[Fn] + [Reverse] This toggles between reverse and normal video only at the text mode.

[Fn] + [Backlit] This turns the LCD backlight off. Pressing any key turns the backlight on. Significantly less power is used when the LCD backlight is off.

[Fn] + [CRT/LCD] This allows you to choose either the internal LCD, external CRT, or both.

[Fn] + [Gauge] The system displays a picture which indicates the amount of remaining battery power and the current power management setting.

[Fn] + [Key Lock] This locks the keyboard and activates the password utility.

[Fn] + [Mute] Toggles the audio output enable or disable

[Fn] + [REST] Enables the REST state. Placing the notebook in the REST state saves battery power.

[Fn] + [↓]/[↑] Change the Audio Output Volume Level.

Battery

Charging the Battery

The AC Adapter charges the battery in two steps:

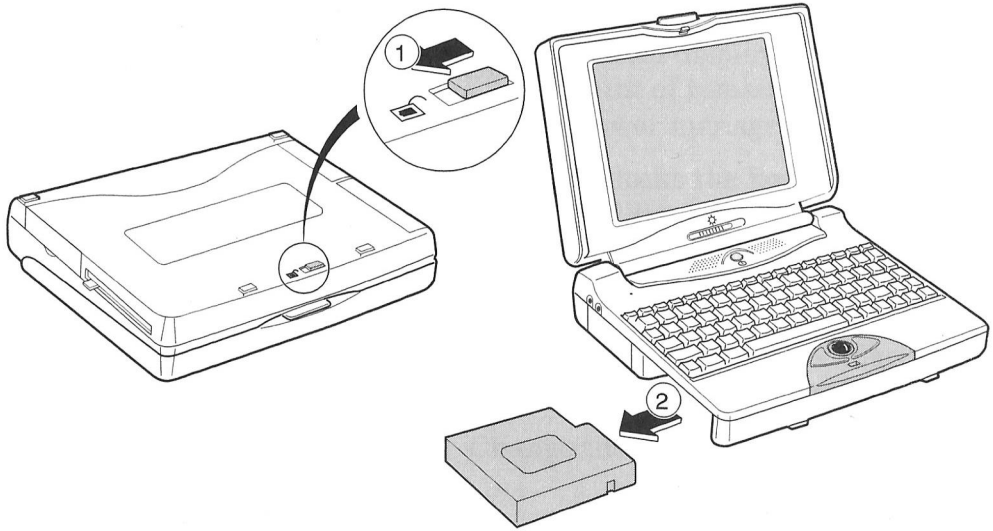
1. Rapid Charge - This charges a fully discharged battery in approximately 2 hours. Rapid Charge occurs as long as all of the following conditions exist:
   - The battery is not fully charged.
   - The notebook is off or in the REST state.
   - The AC Adapter is connected to the notebook and an AC outlet.
2. Trickle Charge - A trickle charge occurs after the standard rapid charge cycle is completed or during the notebook is turned on. The battery continues to trickle charge as long as the AC Adapter remains connected to the notebook and AC outlet to maintain battery charge.

Replacing the Battery (Power Off)

To replace the battery with the notebook off, perform the following steps (Figure 2-8):

1. The battery release lever is located on the bottom of the notebook. Slide the release latch to the right.
2. Remove the battery pack by pulling it out of the notebook.
3. Insert a charged battery (the battery terminal end must go in first).

Figure 2-8.
Removing the Battery Pack



Hot Replacement (Replacing the Battery with Power On)

You can replace the main battery without turning the notebook off. If battery power becomes low the notebook will automatically enter the REST state, indicating that you need to replace the battery or connect the notebook to AC power. Hot Replacement allows the battery to be changed without powering down and restarting the notebook.

Your notebook contains an internal bridge battery that provides power to the suspended notebook (for approximately 5 minutes if the bridge battery is fully charged) when the removable battery is taken out of the notebook.

Warning **If the "Modem Ring Wakeup" function is enabled in the setup utility, Hot Replacement function may not work properly.**

To change the battery without turning the notebook off, perform the following steps:

1. If the notebook is not in the REST state, press **[Fn] + [REST].**
2. The battery release lever is located on the bottom of the notebook. Slide the lever to the left until the battery releases.
3. Remove the battery.
4. Insert a charged battery immediately.
5. Press the space bar to return the notebook to the normal state.

Battery Care

Under normal circumstances, batteries have a useful life of several hundred cycles of charging and discharging. You can increase the life of your battery by performing the following:

- Do not leave the battery fully discharged for extended periods of time.
- Batteries normally discharge power when not used for long periods of time. When not using the notebook for extended periods, be sure to recharge the battery every 6 months.
- Do not charge the battery in temperatures over 35°C or below -5°C.

Note When using a new battery pack for the first time or after prolonged storage, the initial battery charge may be shorter than normal. Normal charge life resumes after a few discharge-recharge cycles.

Battery Power Indicator

The power indicator displays the amount of battery life available at any given time. It also permits you to change the Global Power Management and Power Save Levels without having to enter Setup.

Note The Global Power Management and Power Save Level changes you make through the fuel gauge are permanent. When you turn off your SENS 800, the changed setting will be in effect.

To execute this function, press **[Fn]** + **[Gauge]**. The power save level is displayed on the LCD (Figure 2-9).

Figure 2-9. Battery Power Gauge

SECTION 1

SECTION 2

SECTION 3

SECTION 4

Note Due to the characteristic of battery cells the Battery Level can be very inaccurate for about 10 minutes after charging.

The fuel gauge has 4 sections:

- Section 1 - This displays the global power management state of the system. This section of the fuel gauge can display DC, AC/DC or OFF. These options are described below:
  - DC - Power Management is active only when the notebook is running on battery power.
  - AC/DC - Power Management is active at all times.
  - OFF - Power Management is turned off.

If you would like to change the Power Management option (displayed in section 1), press **[F1]** to toggle through the options.

- Section 2 - The current Power Management System level is shown. This section of the fuel gauge can display Low, Medium, High or USER. These options are described below:
  - Low - The lowest power conservation state.
  - Medium - Medium power conservation.
  - High - High power conservation.
  - USER - User defined power conservation.

  If you would like to change the Power Management level (displayed in section 2), press **[F2]** to toggle through the options.

Note The fuel gauge only permits you to select the currently defined USER options. If you choose to change any of the USER defined options, you must enter Setup.

- Section 3 - A picture of a battery will be displayed if the notebook is operating from battery. If the notebook is operating from AC Power, a picture of an AC plug is shown.

Note While the fuel gauge is displayed, all keys (except: **[F1]**, **[F2]**, **[Esc]** and **[Fn]** + **[Backlit]**) are disabled.

- Section 4 - This displays the battery level with 6 steps.

Press the **[Esc]** key to exit the fuel gauge screen.

Battery Power Alarm Indicator

The notebook continuously monitors the battery level and warns you when the battery reaches a level where it cannot reliably sustain normal operation.

There are two predetermined threshold values that produce warnings, Low Battery (First Warning) and Very Low Battery (Final Warning).

1 Low Battery - When the battery level becomes low, the First Warning occurs. The battery LED flashes and a series of low pitched beeps sound. In addition, if the SENS 800 is in Windows, a pop up window appears informing you that the battery is low. You should:

   a Save your data.

   b Connect the notebook to AC power or replace the battery (refer to the Hot Replacement section of this chapter for details).

2 Very Low Battery - If you do not respond to the Low Battery warning, the battery drains to a point where the notebook is put into the REST state. Just before this happens, the notebook will emit a series of high pitched beeps. While in REST, the notebook is powered by the bridge battery and can remain in this state for approximately 5 minutes if it is fully charged.

Note Refer to Chapter 4 for details on the REST state.

If the Very Low Battery warning occurs, you should:

a Connect the notebook to AC power or replace the battery (refer to the Hot Replacement section of this chapter for details).

b Once external power is provided, press the space bar to resume operation.

WARNING **If the very low battery warning has occurred and the notebook is not connected to an external power source immediately after the REST state, the notebook is shut down and any data in RAM is lost.**

Setup

Introduction

Setup controls the system configuration in the battery-backed CMOS memory. You can change system settings at any time by running Setup.

Setup performs the following operations:

- Displays date, time, and current values for notebook options.
- Lets you change values for notebook options.
- Provides I/O port configuration options.
- Provides notebook power control and power management options.

Entering the Setup Utility

Setup can be executed as follows:

1 When you turn on the notebook, a message similar to the following is displayed during the Power On Self Test (POST).

```
Press Esc to invoke Setup prior to boot.
640K Base Memory, 7168K Extended
```

2 To start the Setup utility, press the **[Esc]** key. The following message is displayed:

```
Press the F1 key to continue, F2 to run the
setup utility
```

3 Press **[F2]** to enter Setup.

Changing Options

- Use the arrow keys to move through the fields.
- Change values by pressing the **[-]** **[+]** or **[space bar]** key. Each time you press one of these keys, Setup displays one of the possible values for the selected option.
- The screen shown in Figure 3-1 is the first of two screens that display the current settings for the notebook. Press the **[PgDn]** and **[PgUp]** key to view the second Setup screen.

Help and System Information

- If you need assistance on a specific field, press **[F1]** for help.
- If you would like to view the current hardware configuration, press **[F3].**

Setup Utility (Page 1 of 2)

Figure 3-1 displays a sample of the first setup screen.

Note This screen is a sample. Field values may vary.

Figure 3-1. System Configuration Setup Screen Sample (Page 1)

```
Pheonix SETUP Utility (Version x.xx) xx
(c) Pheonix Technologies Ltd. 1989, 1994 All Rights Reserved

                                                          Page 1 of 2
                    ** Standard System Parameters **

                System Time : 11:55:58
                System Date : Jnue 12, 1995

                                          Cyl  Hd  Pre  LZ   Sec  Size
                  Hard Disk : Auto-Configure 637  16  0    637  63   313
                  Trackball : Enabled
                 Serial Port : 3F8h
                Audio System : IRQ 5              Infrared Port : Disabled
           Parallel Port Addr : 378h         Modem Ring Wakeup : Disabled
           Parallel Port Mode : Bi-directional
                 Video start-up : LCD
           First Boot Device : Floppy Disk
        Boot Sector Protect : Disabled

Esc      F1       F3                ↑↓          +/-/sp      PgUp/Dn
Menu     Help     Sys Info          Field       Value       Page
```

System Time Displays the notebook's current time in the format of hours, minutes and seconds.

System Date Displays the notebook's current date in the format of month, day and year.

Hard Disk Defines the hard disk installed in the notebook. The Hard Disk setting controls the following information:

Cyl	Number of cylinders. The SENS 800 notebook provide the LBA access mode.
Hd	Number of heads.
Pre	Amount of write precompensation.
LZ	The cylinder of the landing zone.
Sec	Number of sectors per track.
Size	Total disk size in megabytes where the total size in bytes equals: *size* x 1024 x 1024

Note Some disk manufacturers calculate the size as: *size* x 1000 x 1000.

Valid Hard Disk values are:

Auto-Configure (Default)	The HDD type is automatically determined by the notebook.
Disabled	The HDD is not installed.

When set to Auto-Configure, the notebook automatically determines the type of hard disk installed in the notebook, eliminating the need for intervention. All SENS 800 hard drive options support the Auto-Configure feature.

Trackball Enables or disables the trackball. Valid values are:

Enabled (Default)	Sets the internal PS/2 trackball is enabled.
Disabled	Does not allow the trackball to be used.

Serial Port Allows you to define the serial port. Valid values are:

3F8h (Default)	Sets the serial port to communication port COM1.
Disabled	Disables the port which frees up system resources.

Audio System Allows you define the system audio interrupt. Valid values are:

IRQ 5 (Default)	Sets the audio interrupt to IRQ5.
IRQ 9	Sets the audio interrupt to IRQ9.
Disabled	Disables the SENS 800 audio system.

Parallel Port Allows you to define the parallel port. Valid values are:

378h (Default)	Sets the parallel port to communication port LPT1.
278h	Sets the parallel port to communication port LPT2.
Disabled	Disables the port which frees up system resources.

Parallel Mode Allows you define the parallel mode.

Standard	Operates as a standard parallel port.
Bi-directional (Default)	Operates as a bi-directional parallel port.
ECP Mode	Operates as a ECP mode.
EPP Mode	Operates as a EPP mode.

Video Start-up Defines the video mode used when the system is booted.

LCD	The bootup video mode is LCD.
CRT	The video mode is CRT when the system is booted.
Both (Default)	The bootup video mode is CRT and LCD.

First Boot Device Selects which device the notebook will attempt to boot from first. Valid values are:

Hard Disk	Forces the notebook to boot from the HDD before attempting to boot from the FDD.
Floppy Disk (Default)	The notebook attempts to boot from the FDD before attempting to boot from the hard disk.

The Hard Disk option allows the notebook to start up quickly since it by-passes the procedures to boot from the FDD.

Boot Sector Protect This is a BIOS anti-virus feature that prevents a virus from modifying the hard disk's boot sector.

Enabled	Enables this feature.
Disabled (Default)	Disables this feature.

Note This feature only provides protection against those viruses that attempt to modify the boot sector using BIOS functions. Some hard disk utilities may require that this feature be disabled to function properly.

Infrared Port Enables or Disable the Infrared port.

Disabled (Default)	Disable the port.
Enabled	Sets the Infrared port is enabled.

Modem Ring Wakeup Determines whether or not PCMCIA modem activity will wake the system from the REST to RAM state.

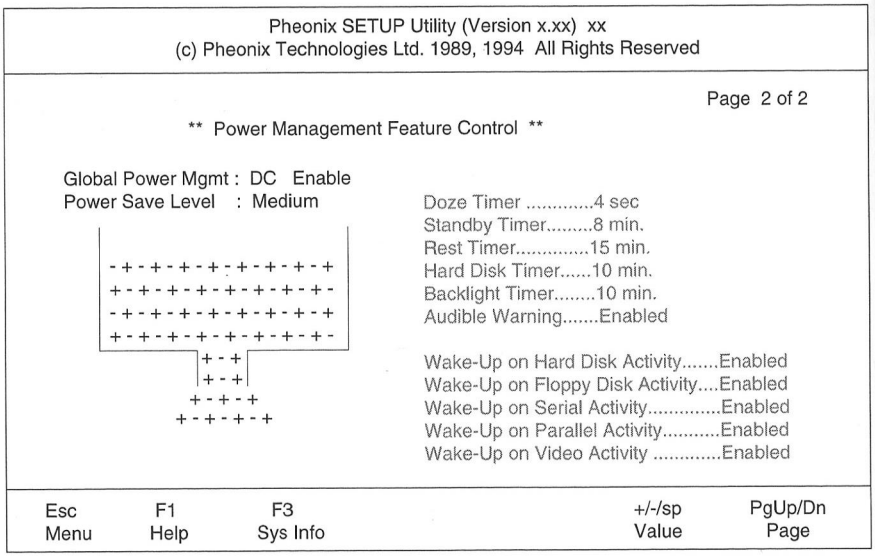
Disabled (Default)	Modem activity will not wake the system.
Enabled	Modem activity will wake the system.

Setup Utility (Page 2 of 2)

Page 2 of the setup utility includes power management information. These options are designed to reduce the notebook's power consumption. Figure 3-2 displays a sample of page 2.

Note This screen is a sample. Field values may vary.

Figure 3-2. System Configuration Setup Screen Sample (Page 2)


Pheonix SETUP Utility (Version x.xx) xx
(c) Pheonix Technologies Ltd. 1989, 1994 All Rights Reserved
Page 2 of 2
** Power Management Feature Control **
Global Power Mgmt : DC Enable
Power Save Level : Medium
Doze Timer .....4 sec
Standby Timer.....8 min.
Rest Timer.....15 min.
Hard Disk Timer.....10 min.
Backlight Timer.....10 min.
Audible Warning.....Enabled
Wake-Up on Hard Disk Activity.....Enabled
Wake-Up on Floppy Disk Activity....Enabled
Wake-Up on Serial Activity.....Enabled
Wake-Up on Parallel Activity.....Enabled
Wake-Up on Video Activity .....Enabled
Esc Menu
F1 Help
F3 Sys Info
+/-/sp Value
PgUp/Dn Page

Note Refer to Chapter 4 for a detailed description of how Power Management works on the system.

Global Power Mgmt Permits you to determine when Power Management will function.

DC Enable	Power Management is active only when the notebook is running on battery power.
AC-DC Enable	Power Management is active at all times.
Disable	Automatically turns off Power Management of all devices.

Power Save Level Configures the Power Management System. Valid values are:

Low	to minimum level.
Medium (Default)	to middle level.
High	to maximum level.
User Defined	Allows you to customize how power is managed.

Doze Timer Specifies when the notebook will transition from the normal state to the Doze state (the first power conservation state). The Doze state slows the CPU speed to at slow speed. Valid values are:

1/8, 1/4, 1/2 1, 4, 8 16sec	Time in seconds the notebook can remain idle before it is transitioned into the Doze state.

Standby Timer Specifies the amount of time the notebook remains idle in the Doze state before being automatically transitioned into Standby state (the second power conservation state). In the Standby state, the CPU clock is stopped and the LCD, HDD and FDD are powered down. Several internal subsystems are also set to a lower power level (for example, the VGA and power management controllers). Valid values are:

Disabled	Prevents the notebook from entering the Standby state from the Doze state.
1, 2, 4, 6, 8, 12, 16 min.	Time in minutes the notebook remains idle in the Doze state before the notebook is transitioned into Standby state.

REST Timer This is the amount of time the notebook remains idle in the Standby state before it is transitioned into the REST state (the greatest power conservation state). While in the REST state, the CPU, LCD, HDD and FDD as well as other key subsystems are turned off. The notebook consumes very little power while in the REST state. Valid values are:

Disabled	Prevents the notebook from entering the REST state from the Standby state.
5, 10, 15, 20, 30, 40, 60 min.	Time in minutes.

Hard Disk Timer This function sets the timeout for stopping the hard disk motor. If the hard disk drive is not accessed for the pre-selected interval, the hard disk motor is powered off. The HDD is automatically restarted when accessed. The valid values are:

Disabled	Prevents the HDD from powering down.
3 min. thru 20 min	Time in minutes before timeout.

Backlight Timer Determines how long the LCD's backlight will remain on without keyboard and video activity. Valid values are:

Disabled	Prevents the LCD backlight from turning off.
5, 10, 15, 20, 25 min.	Time in minutes that the keyboard and video remain idle before the backlight turns off.

Audible Warning Controls the notebook beeps in case of low battery state or change of REST/Resume state. Valid values are:

Enabled	Activates the notebook beeps.
Disabled	Deactivates the notebook beeps.

Wake-up on Hard Disk Activity If this value is set to enabled, the notebook returns to full power on state from Doze or Standby state if the hard disk drive is accessed. Valid values are:

Enabled	The notebook returns to normal state from Doze or Standby state when the HDD is accessed.
Disabled	The notebook will not return to normal state when the HDD is accessed.

Wake-up on Floppy Disk Activity If this value is set to enabled, the notebook returns to full power on state from Doze or Standby state if the floppy disk drive is accessed. Valid values are:

Enabled	The notebook returns to normal state from Doze or Standby state when the FDD is accessed.
Disabled	The notebook will not return to normal state when the FDD is accessed.

Wake-up on Serial Activity If this value is set to enabled, the notebook returns to full power on state from Doze or Standby state if serial port activity is performed. Valid values are:

Enabled	When serial port activity is performed, the notebook returns to normal state from Doze or Standby state.
Disabled	The notebook will not return to normal state when serial port activity occurs.

Wake-up on Parallel Activity If this value is set to enabled, the notebook returns to full power on state from Doze or Standby state if parallel port activity is performed. Valid values are:

Enabled	When parallel port activity is performed, the notebook returns to normal state from Doze or Standby state.
Disabled	The notebook will not return to normal state when parallel port activity occurs.

Wake-up on Video Activity If this value is set to enabled, the notebook returns to full power on state from Doze or Standby state if video activity is performed. Valid values are:

Enabled	When video activity is performed, the notebook returns to normal state from Doze or Standby state.
Disabled	The notebook will not return to normal state when video activity occurs.

Exiting Setup

To exit Setup, press the **[Esc]** key. Perform any of the following:

- Press **[Esc]** to continue with Setup.
- Press **[F4]** to save values then exit from Setup, and reboot.
- Press **[F5]** to load default values for all pages.
- Press **[F6]** to exit Setup without saving values.

Power Management

Introduction

Power conservation maximizes the amount of time your notebook operates from battery. Power management extends battery operation by monitoring the notebook for activity and reducing power to those subsystems that are inactive. For example, power management can reduce the speed of the notebook's microprocessor if the keyboard, video, FDD, and HDD are not in use for a specified period of time. Reducing the speed of the microprocessor reduces power consumption.

In addition, this system is fully compliant with the Advanced Power Management (APM) features of MS-DOS and Windows. Systems that comply with Advanced Power Management provide longer battery operation, more features and greater application compatibility than systems that do not.

Note The system's internal power management is configured through Setup (refer to Chapter 3 for details). MS-DOS's Advanced Power Management is controlled using POWER.EXE while Windows is controlled using the Windows Control Panel (select the Power icon).

APM (Advanced Power Management)

The SENS 800 Noteboot Series supports the Intel/Microsoft APM specification. Using APM reduces power usage when applications and devices, such as the hard disk, are idle.

Use the POWER.EXE driver provided by MS-DOS to set APM.

Installation

Edit your CONFIG.SYS file using the following steps:

1 Type:

```
CD\ [Enter]

EDIT CONFIG.SYS [Enter]
```

2 Define the POWER.EXE file (found in your MS-DOS directory) as a CONFIG.SYS device driver. Type:

```
DEVICE=C:\[path name]\POWER.EXE
```

A sample CONFIG.SYS file might look something like this:

```
FILES=30

:

DEVICE=C:\MSDOS\HIMEM.SYS

DEVICE=C:\MSDOS\POWER.EXE

:
```

3 Save the file and exit.

4 Turn the power off then back on again to reboot your system.

Edit the Windows configuration using the following steps:

1 To configure the Windows Setup program, type:

```
CD\WINDOWS [Enter]

SETUP [Enter]
```

2 Use the [↑] and [↓] direction keys to move the highlighting bar to the "Computer definition field" and press [Enter].

3 Move the highlight bar to select "MS-DOS System with APM" and press [Enter].

4 Move the highlight bar to select "Accept the configuration shown above" and press [Enter].

5 The system will show the modified configuration.

6 Insert the program diskette that the system requests and press [Enter].

Note Please refer to the README.TXT file in MS-DOS and the README.WRI file in Windows 3.1 for more detailed information about POWER.EXE and Power command.

Usage

Use the following steps to start using APM:

1 At the MS-DOS prompt, type:

```
POWER [Enter]
```

2 The power program displays the current CPU, Battery and the remaining battery capacity, for example:

```
Power Management Status
_______________________

Setting = ADV:REG
CPU: IDLE xx% of time


AC Line Status : ONLINE
```

Perform the following steps from within the Windows File Manager:

1 Start Windows. At the MS-DOS prompt, type:

```
WIN [Enter]
```

2 In the Basic Program Group, select the Control Panel icon and press [Enter]

3 Select the Power icon and press [Enter]

4 The system will display the current Power Management mode, battery level and power source.

5 To change the Power Management mode, then press [Alt] and [P] simultaneously.

6 Use the [↑] and [↓] arrow keys to select the Power Management mode, then press **[Alt]** and **[F4]**.

Note APM does not operate perfectly when run under the MS-DOS prompt in Windows 3.1 .

System States

There are five major system states:

- Full On
- Doze
- Standby
- REST
- System Off

Of these states, Full On consumes the most power while System Off consumes the least. Power management is the process that transitions the notebook between these various states.

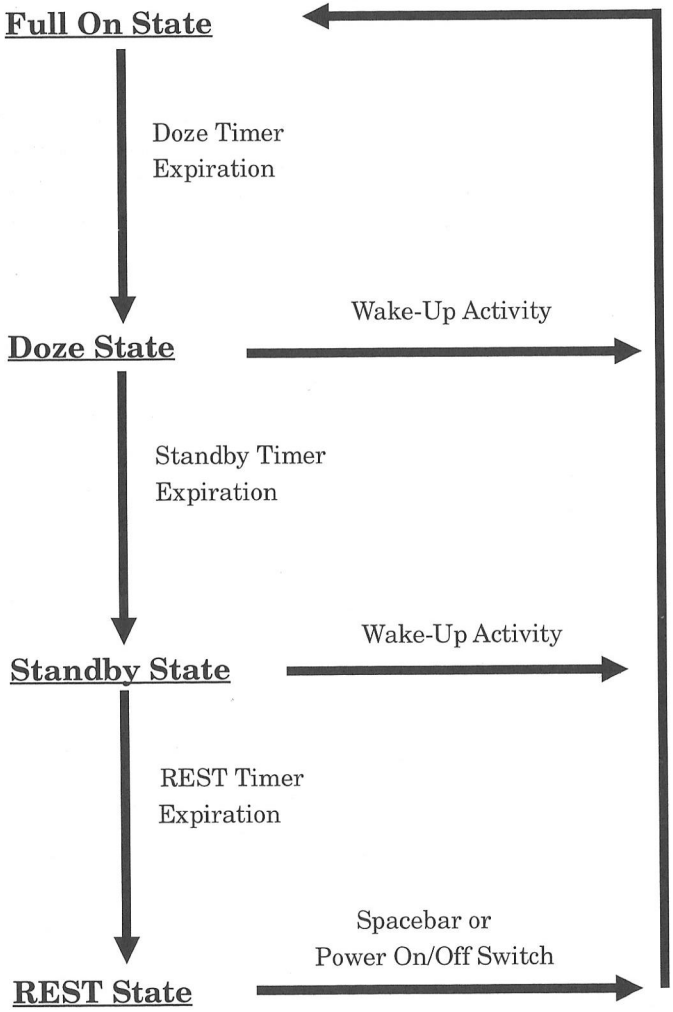
Timers are used to measure how long a subsystem has been inactive. When a timer expires, the notebook is transitioned to the next lower power consuming state. When activity is detected, the notebook is automatically transitioned to Full On and the necessary timers are reset. The transition between states is displayed in Figure 4-1.

Note

- Some applications may require that power management be disabled to operate properly. If you experience any problems with an application, try disabling power management.
- When you connect the external CRT monitor to the system,
  a If some CRT monitors display a horizontal line on the screen when the system enters Standby mode, power off the CRT monitor to protect screen damage.

b If some CRT monitors do not display any data on the screen after the system comes back to the Full On mode from the Standby mode, power off the CRT monitor and then power it on to restore the display.

Figure 4-1. Transition from Full On to REST



Full On

All subsystems are fully powered and the microprocessor is operating at full speed. The notebook remains in this state as long as it detects activity or if power management has been disabled.

Doze

This is the next lower power state after Full On. The notebook automatically transitions from Full On to Doze if the Doze Timer has expired. This timer expires when no activity is detected during the entire length of the timer.

The notebook will return to Full On from Doze if activity has been detected, such as entering keystrokes at the keyboard. You can configure which activities wake the notebook. Refer to the Wake-Up Activities section described later in this chapter about the activities that can be monitored.

Standby

This is the next lower power state after Doze. In this state the microprocessor is set to the lowest speed possible, the LCD is powered off and various subsystems, such as VGA and power management controllers, are either powered off or put into a reduced power state.

The notebook automatically transitions from Doze to Standby when the Standby Timer has expired. The Standby Timer counts down upon entering the Doze state and as with Doze, the notebook will automatically transition to Full On when activity has been detected. Refer to the Wake-Up Activities section described later about activities that can be monitored.

REST

Other than off, this is the lowest power state. In the REST state, power to the microprocessor, LCD, HDD, FDD and other subsystems is turned off. The only subsystem powered are those needed to properly return the notebook to Full On.

The notebook can enter the REST mode in several ways:

- The notebook automatically transitions from Standby to REST on expiration of the REST timer. The REST timer starts counting when the notebook enters Standby.
- If no user action is taken on a Very Low Battery warning, the notebook can also automatically transition to REST.
- You can manually put the notebook into REST at anytime by pressing **[Fn]** + **[REST]**.

Pressing the spacebar or the power On/Off switch while in REST transitions the notebook to Full On.

There are two types of REST states:

- REST to Random Access Memory (RAM)
- REST to Disk

REST to RAM In the REST to RAM (also known as Suspend to RAM) state, all of the devices are turned off while the contents are saved to memory and every so often, the contents are checked by the memory subsystem. In this state, the computer memory subsystem is still enabled in a low power state. With a FULLY charged battery, the computer can be left in this state for approximately 1 week. Upon resume, the contents are restored to their previous state and the computer is ready to continue from where it left off.

Warning **If the battery runs out of charge while the system is in the REST state, data loss is possible. With a FULLY charged battery, the system should remain in the REST state for approximately 1 week if Ring Wakeup is disabled in the setup.**

REST to Disk In the REST to Disk (also known as Suspend to Disk) state, all of the devices including the memory contents are saved to a separate disk partition and the entire computer is turned off. In this state, the contents are saved indefinitely until the computer is resumed by hitting the power on button. Rest to Disk setting can be selected by running SUSTODSK.EXE utility.

To enable REST to Disk, a separate partition is required.

Note For more informations, refer to Chapter "Software and Utilities"

Additional Capabilities

In addition to the previously described power states, the notebook also contains the following features to help conserve battery power.

Backlight Timer

The notebook can be configured to turn off the LCD's backlight when the Backlight Timer expires. This timer, available when the notebook is in the Full On or Doze state, is reset when a key is pressed or video is accessed.

You can manually turn off the backlight at anytime by pressing **[Fn]** + **[Backlit]**. Pressing any key on the keyboard will turn the backlight on if it is currently off.

Hard Disk Timer

The HDD provided with your notebook has its own power management system and can be configured to power down after a period of inactivity. The Hard Disk Timer establishes how long the system will remain inactive before reducing its power. Any access to the HDD resets the Hard Disk Timer.

Wake-Up Activities

The notebook has the ability to wake-up or transition from Doze/Standby to Full On if any of the following subsystems are found to have activity:

- HDD
- FDD
- Serial Ports
- Parallel Port
- Video

Power Save Levels

To simplify power management, several predetermined Power Save Levels are available. This allows you to quickly configure how the various Timers and Wake-Up Activities should be configured. The Power Save Levels are:

- Low
- Medium
- High

If any of these predetermined levels do not meet your power management needs, you also have the ability to customize power management by setting the Power Save Level to:

- User Defined

Low Provides a low level of power conservation. Timers and Wake-Up Activities are set as follows:

Doze Timer	8 sec
Standby Timer	16 min.
Rest Timer	30 min.
Hard Disk Timer	20 min.
Backlight Timer	20 min.
Audible Warning	Enabled
Wake-Up on Hard Disk Activity	Enabled
Wake-Up on Floppy Drive Activity	Enabled
Wake-Up on Serial Activity	Enabled
Wake-Up on Parallel Activity	Enabled
Wake-Up on Video Activity	Enabled

Medium Provides a medium level of power conservation. The notebook is set to this value at the factory. Timers and Wake-Up Activities are set as follows:

Doze Timer	4 sec
Standby Timer	8 min.
Rest Timer	15 min.
Hard Disk Timer	10 min.
Backlight Timer	10 min.
Audible Warning	Enabled
Wake-Up on Hard Disk Activity	Enabled
Wake-Up on Floppy Drive Activity	Enabled
Wake-Up on Serial Activity	Enabled
Wake-Up on Parallel Activity	Enabled
Wake-Up on Video Activity	Enabled

High Provides the highest level of power conservation. Timers and Wake-Up Activities are set as follows:

Doze Timer	1 sec
Standby Timer	4 min.
Rest Timer	5 min.
Hard Disk Timer	3 min.
Backlight Timer	5 min.
Audible Warning	Enabled
Wake-Up on Hard Disk Activity	Disabled
Wake-Up on Floppy Drive Activity	Disabled
Wake-Up on Serial Activity	Disabled
Wake-Up on Parallel Activity	Disabled
Wake-Up on Video Activity	Disabled

User Defined By selecting User Defined for the Power Save Level you have the ability to specify which activities will return the notebook to Full On. The fewer activities you specify, the more power you save.

PCMCIA

Introduction

The Personal Computer Memory Card International Association (PCMCIA) was formed with the goal of promoting interchange ability of Integrated Circuit Cards (IC Cards) among a variety of computer and electronic products. Founded in 1989, PCMCIA is an open standards body that specifies physical, electrical, and software requirements for both data and storage (Memory) and peripheral expansion (I/O) IC cards. Cards that are PCMCIA compliant are commonly referred to as PC cards or PCMCIA cards.

PCMCIA Cards

The PCMCIA 2.1 Standard, published in July 1993, defines the PC card requirements. PCMCIA cards have a 68-pin connector at one end and are similar in size to a typical credit card. The standard currently defines three types of cards, Type I, Type II, and Type III. The primary differences between the three types is the thickness.

Type	Thickness (mm)
I	3.3
II	5.0
III	10.5

The thinner Type I and II cards will work in a Type III slot and a Type I card will work in a Type II slot. Thicker cards, however, will not work in the thinner slots (e.g. A Type III card will not work in a Type II slot). Generally Type I cards are Memory cards, while Type II cards are I/O cards such as Modems, LAN cards, SCSI cards, and Sound cards. The Type

III cards are usually ATA Hard Drives or other larger I/O devices. The various types of cards available are described in the following section.

Memory Cards

Most memory cards are either SRAM or FLASH cards. SRAM cards have an internal battery to retain the memory when the card is not plugged in. SRAM cards offer very fast access times, but limited capacities. As of early 1994, SRAM cards are available as large as 4 MB. FLASH cards, on the other hand, do not require a battery to retain data. FLASH cards have much greater capacities, but have slower access times than SRAM cards. As of early 1994, FLASH cards are available as large as 40 MB.

If you want to use the flash memory card, you should get the MS-FLASH.SYS and other utility files from card vendor.

Modem Cards

The most common PCMCIA device at this time is the PCMCIA modem. As of early 1994, PCMCIA modems are available that operate at speeds up to 14,400 baud and use V.32 BIS data compression. These modems usually operate as a FAX modem as well.

LAN Cards

There are many PCMCIA LAN cards available. These network cards include 10BaseT, 10Base2, Token Ring, and IBM 3270 Emulation. These cards make connecting your notebook computer to a network easier than ever.

ATA Hard Disks

There are two different types of ATA compatible PCMCIA cards. The first is an actual ATA Hard Disk. As of early 1994, these cards offered as much as 170 MB. The other type of card is a FLASH card which emulates an ATA card. These cards offer as much as 40 MB.

Other Cards

The PCMCIA standard is expected to have the same effect as the XT/AT specification had on desktop computers. As a matter of fact, PCMCIA is being integrated into desktop systems as well as notebook computers. Additional types of cards are being introduced by third party companies at an increasing rate. These include SCSI, Sound, VGA, and other multi-function cards.

SENS 800 PCMCIA Slots

PCMCIA Slot Locations

The SENS 800 supports Type II and Type III cards. Figure 5-1 displays the slot locations.

Figure 5-1. PCMCIA Slot Locations

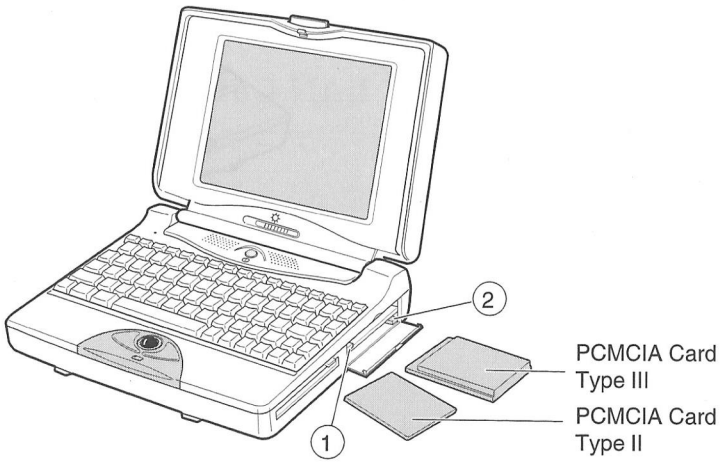


Table 5-1. Slot Locations (shown in Figure 5-1)

Item	Description
1	Type III PCMCIA card slot.
2	Type II PCMCIA card slot.

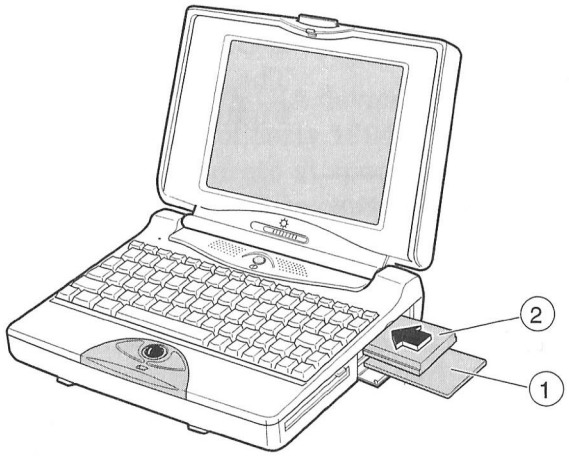
PCMCIA Card Insertion

Perform the following steps to insert a PCMCIA card into the PCMCIA slot.

1 Insert the PCMCIA card into the appropriate PCMCIA slot (Figure 5-2).

2 When you are sure the card has been correctly placed in the PCMCIA card slot guides, press the card firmly into the slot until it is properly seated.

Figure 5-2. Inserting a PCMCIA Card



PCMCIA Card Removal

To remove a PCMCIA card, simply press the appropriate release latch. Figure 5-3 displays the location of the Type III PCMCIA card release latch and Figure 5-4 displays the location of the Type II PCMCIA card release latch.

Figure 5-3.
Type III PCMCIA Card Release Latch

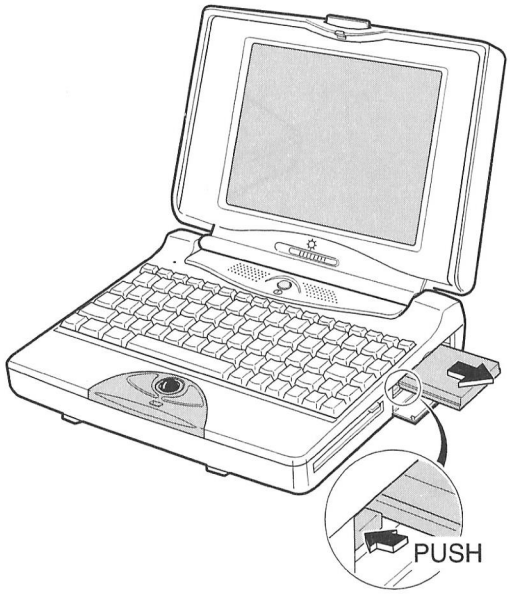
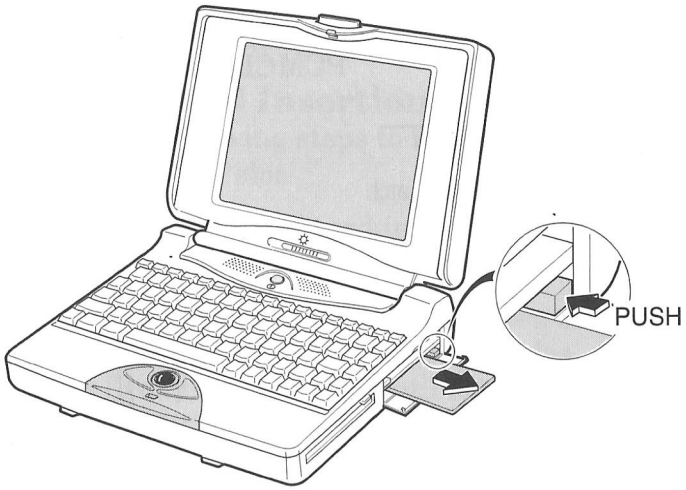


Figure 5-4.
Type II PCMCIA Card Release Latch



PCMCIA Drivers Installation

Insert the Utility diskette into the floppy disk drive and type:

```
A:INSTALL [Enter]
```

The Help file included with the PCMCIA driver contains more detailed information.

Note

- Use IRQ11 for PCMCIA Card Service .
- Use COM3 for PCMCIA modem communication port.

- If you use the optional Cable Master, the total number of PCMCIA sockets will be 4. If the PCMCIA driver is already installed on the system, run PCMSETUP.EXE to change the configuration.
- If you use only the system of which the total number of PCMCIA sockets is set to 4, some cards of the ATA type may not be operated at the socket 0 and socket 1.

Optional Components

This chapter describes items that can be purchased and used with the notebook.

Additional HDD

If desired, additional hard disk drives can be purchased to be used in the notebook's removable hard disk bay. Use the following steps to install an HDD:

1 If the notebook is on, turn it off.

WARNING **Never remove or install the HDD with the notebook power on. Equipment or data may be damaged if the HDD is removed or inserted with power on. When removing HDD, wait at least 10 seconds after system power off.**

2 If you have connected any cables, disconnect them.

3 If the HDD currently installed in the SENS 800 it is secured by the retaining screw:

WARNING **Reduce the chance of damage due to Electro Static Discharge by properly grounding yourself and the notebook.**

a Open the keyboard with a flat blade screwdriver by inserting the screwdriver horizontally between the **[space bar]** and the outer edge of the keyboard.

Caution **Be careful not to scratch the SENS 800.**

b Gently pry the keyboard open. The bottom edge of the keyboard will lift upward.

Caution **Do not disconnect the ribbon cables connecting the keyboard to the main board.**

c Carefully lift up the bottom of the keyboard.

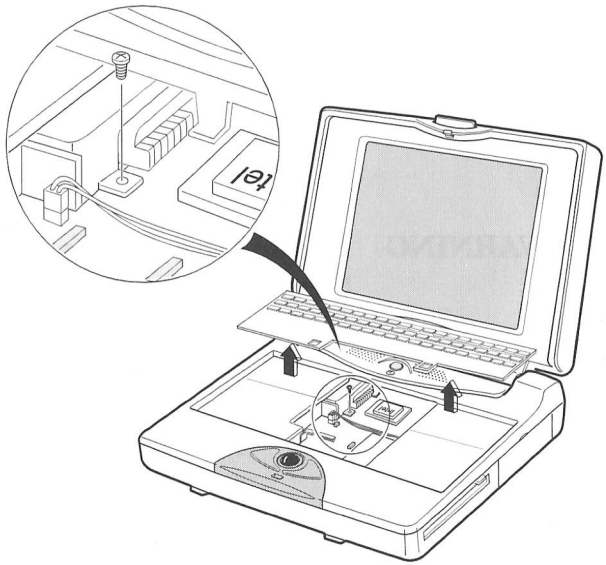
d Lift up the heatsink after removing its retaining screws.

e Remove the retaining screw (Figure A-1).

f Assemble the heatsink with its retaining screws.

g Replace the keyboard.

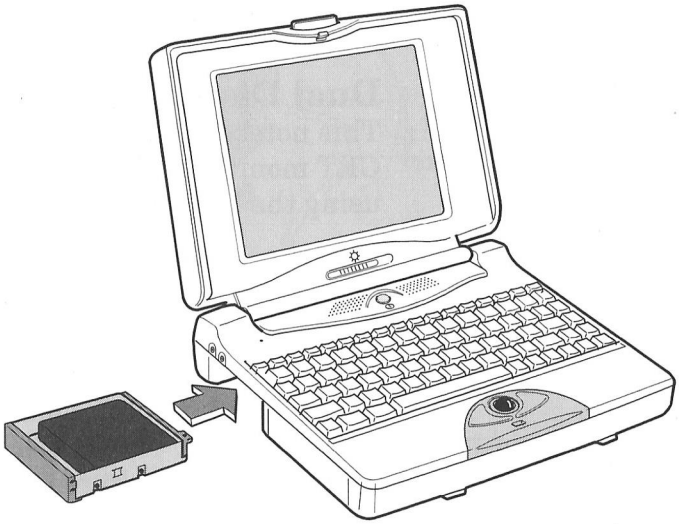
Figure A-1.
Removing the HDD Retaining Screw



4 Remove the pre-installed HDD.

5 Hold the new HDD pack firmly. Gently slide the HDD pack into the notebook (Figure A-2) until it "clicks" into place.

Figure A-2. Installing the HDD



External CRT Display

This notebook can support the following video modes on an external VGA or SVGA monitor:

- Video Graphics Array (VGA)
- Enhanced Graphics Adapter (EGA)
- Color Graphics Adapter (CGA)
- Monochrome Display Adapter (MDA)
- Super Video Graphics Array (SVGA)

Dual Display

This notebook can use the LCD panel and external CRT monitor simultaneously. This is accomplished using the **[Fn]** and **[CRT/LCD]** key combination.

High Resolution Modes

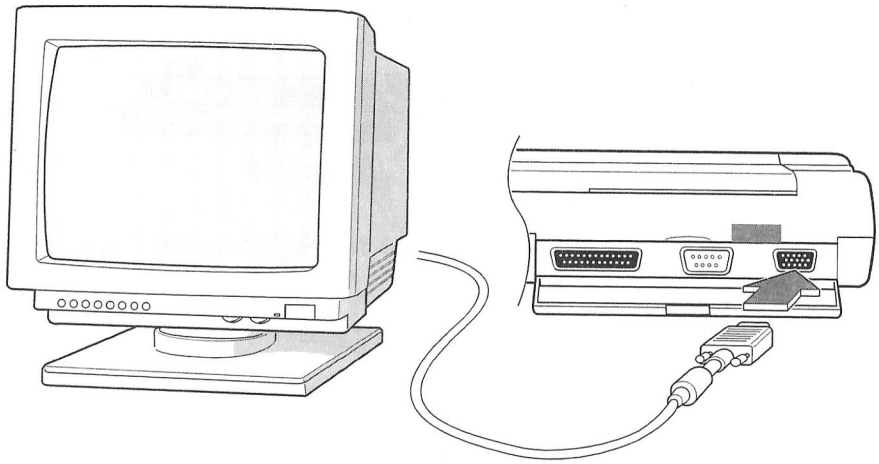
The LCD panel does not support video modes greater than 640x480. If a higher resolution mode is configured for Windows and an external monitor is not attached, the LCD panel will revert to the 640x480 mode. This feature allows the system to utilize higher resolution modes with an external monitor and then (after exiting Windows) use the LCD panel without reconfiguring the video mode.

Connecting

Perform the following steps to connect an external display.

1. If the notebook is on, turn it off.
2. Connect the external monitor's cable to the external video port on the rear of the notebook.
3. Turn on the notebook.

Figure A-3.
Connecting External CRT Display



External PS/2 Device

This notebook has a PS/2 compatible port that enables the use of a PS/2 mouse, Numeric Keypad, or PS/2 type keyboard.

Connecting

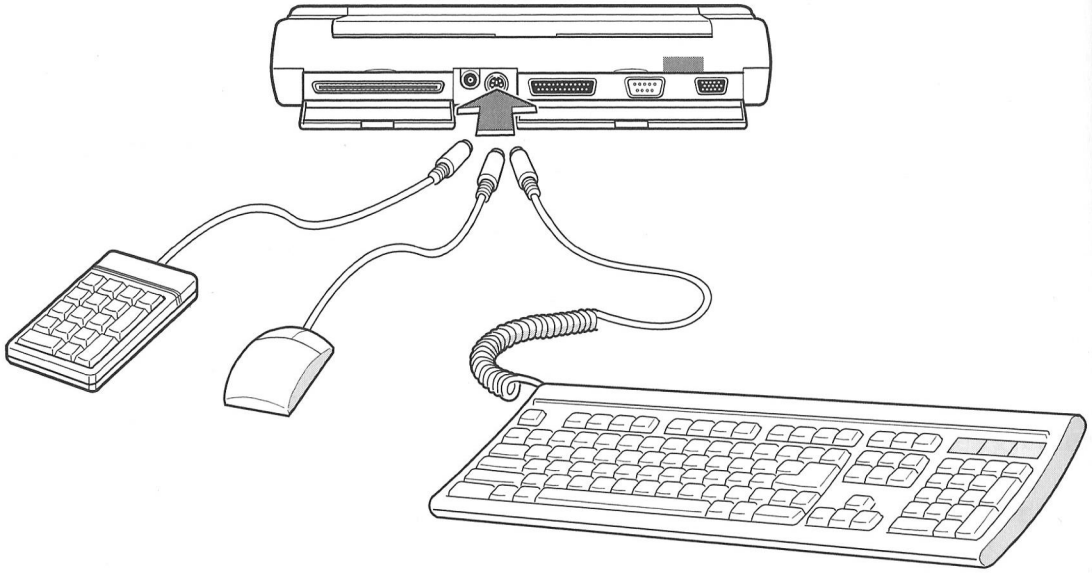
Perform the following steps to connect a PS/2 mouse, numeric keypad or PS/2 keyboard.

1 If the notebook is on, turn it off.

2 Plug the cable of the PS/2 mouse, keypad, or keyboard into the PS/2 compatible connector on the notebook.

3 Turn on the notebook.

Figure A-4.
Connecting External PS/2 Device



Expansion Memory Card

The notebook has 8 MB of DRAM directly mounted on the Main Board. Memory capacity may be expanded by installing one of three optional Memory Expansion Cards available in the following increments: 8 MB, 16 MB, 32 MB.

Installing

Perform the following steps to install the memory card.

1 If the notebook is on, turn it off.

2 Disconnect the power cord.

WARNING **Reduce the chance of damage due to Electro Static Discharge by properly grounding yourself and the notebook.**

3 Open the keyboard with a flat blade screwdriver as follows:

a Insert the screwdriver horizontally between the **[space bar]** and the outer edge of the keyboard.

Caution **Be careful not to scratch the SENS 800.**

b Gently pry the keyboard open. The bottom edge of the keyboard will lift upward.

Caution **Do not disconnect the ribbon cables connecting the keyboard to the main board.**

4 Carefully lift the bottom of the keyboard upward.

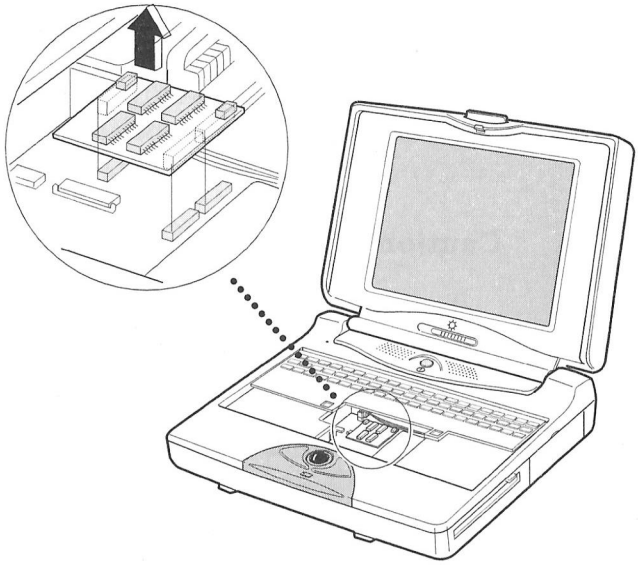
5 Remove the memory card from its anti-static bag.

6 Line up the 3 connectors with the memory card connectors and insert the memory card into the computer (Figure A-5).

7 When you are sure the card has been correctly placed in all 3 connectors, press the card firmly into the socket until properly seated.

8 Replace the keyboard (back side of keyboard first, then slide the keyboard down).

Figure A-5.
Installing Expansion Memory



External Charger

An external battery charger is available which can quickly charge a battery pack. The External Charger connects to the AC Adapter or Automobile Cable and charges a battery pack in approximately 2 hours. When the battery pack is fully charged, the External Charger automatically stops charging the battery.

Automobile Cable

This cable plugs into your cigarette lighter to provide power to your notebook.

Battery

Spare batteries are available to provide you with longer portable operation time.

AC Adapter

If you wish, you may purchase additional AC Adapters.

Cable Master I

The Cable Master-I option allows the SENS 800 to quickly connect to standard desktop devices. Also known as a port replicator, the device allows you to connect the SENS 800 to a CRT, Mouse, External Keyboard, AC Adapter, Serial Device and Parallel Device with one quick and easy connection. It is designed for quick connections to one or more of these devices at a time.

Cable Master II

The Cable Master-II option includes all of the features of the Cable Master-I option in addition to providing:

- 2 PCMCIA slots (1 Type II and 1 Type III) and
- A built in AC Adapter.

The AC Adapter provides power to the SENS 800 and additional PCMCIA slots in the CableMaster II. The AC Adapter in the Power Dock provides enough power to charge the battery using a standard charge rate and power the SENS 800 simultaneously. When the SENS 800 is off or in the REST state, the Cable Master II charges the battery using a quick charge rate.

Numeric Keypad

An external numeric keypad can be attached to the notebook.

Software and Utilities

The notebook contains the following software:

- MS-DOS
- MS-DOS On-Line Documentation
- Microsoft Windows (Optional)
- Microsoft Windows On-Line Documentation (Optional)
- System Password Utility
- System Power Management Utility
- Drivers for PCMCIA (see chapter 5 for details)
- Video Drivers
- Audio Drivers

Password Utility

Your notebook provides password protection for your system. When enabled you can protect your system during System Startup or when leaving your notebook unattended.

Setting Your Password

To set your password you will require a formatted floppy disk. This diskette is a Key Disk that can be used to access your computer if you should ever forget your password. To install your password perform the following steps:

1. Label your formatted floppy disk for future reference.
2. Insert the Key Disk into the system drive.
3. Type the following command at the MS-DOS prompt:

```
PASSWORD
```

4 Follow the prompts provided by the program.

5 Once you have installed your password on your system remove the Key Disk from the FDD and store it in a safe place. Remember, this disk will allow you to access your computer if you should ever forget your password.

Using Your Password

Once you have installed password protection on your notebook you will be prompted to type in your password every time the system is started.

You may enable your password protection when leaving your system unattended by pressing the **[Fn]** + **[KeyLock]** hotkey. To access your system after this you must type in your password.

Removing the Password

If you have forgotten your password, you may remove it with the diskette containing your password. The following steps describe how to remove the system password.

To remove a known password:

1 After you enter the correct password, press **[/]**, and then type the password again as shown below.

```
Enter Password: XXXXXXX/
```

2 Press **[Enter]**.

To remove an unknown password:

1 Insert the Key Disk in drive A and reboot your notebook.

2 Press **[Enter]** three times at the following prompt:

```
Enter Password:
```

3 The notebook displays the following:

```
Password Disabled.
Remove the diskette and press ENTER to reboot.
```

4 Remove the Key Disk from drive A and press the **[Enter]** key to continue.

Video Drivers

The VGA Graphics Controller in your SENS 800 Notebook Computer provides the following features:

1 Compatible with standard IBM VGA.

2 Local bus architecture for very fast speed.

3 Supports simultaneous display.

4 Supports high resolution display(1024X768X256 colors) on an external monitor.

Installing the Video Driver and Utility for MS-DOS

Insert the diskette contains the video driver for MS-DOS into drive A: and type the following:

```
A: [Enter]
INSTALL [Enter]
```

Note Follow the instructions on the screen to install the video driver.

1 Refer to the HELP feature.

2 Selected driver file will be copied into the specific disk or directory.

3 Refer to "README" file for more detail information.

Installing the Video Driver for Windows

This system provides its own video driver for Windows which supports faster video performance under the Windows environment. Install as follows:

1 Run Windows.

2 Select the "File Manager" in the Windows Main group.

3 Insert the diskette containing video driver into the FDD and select the A: drive icon.

4 Run "INSTALL.EXE" on the right window with a double click.

"Winmode" icon will be made in "Video Utilities" group.

Audio Drivers

The Audio Drivers support only Windows. They provide Digital Audio Record and Playback function.

Installing the Audio Drivers

Install the Audio Driver for the first time

1 Run Windows

2 Select Run.. in the File Menu of the File Manager.

3 Insert diskette 1 into FDD and type the drive name and SETUP into the Command Line: (ex. A:\SETUP)

4 Click the "OK" button to start the installation.

Change the installed Audio Driver setup

1 Run Windows and select the Audio utility program group.

2 Select the Setup icon. The first Setup window will be appear.

Install the Audio Driver

1 Select "Continue" at the first Setup window.

2 Select "Driver Installation".

3 Select "Automatic Board Configuration"

4 Select Restart Windows.

Install the Audio Software

1 Select "Continue" at the first Setup window.

2 Select "Software Installation".

3 Input the directory for Audio Software installation and select "OK"

4 Select "Create Directory"

5 Select "Complete Installation".

6 If you want to install the Audio Driver, select "Driver Installation".

Remove the Audio Driver

1 Select "Continue" at the first Setup window.

2 Select "Driver Uninstallation".

3 Select "Restart Windows".

Note

1 When Re-installing the Audio Driver, remove the installed driver first.

2 When you install the Audio Driver with "Custom Board Configuration" for Hardware Setting, set as follows.

I/O Address :	220h
Interrupt :	IRQ 5 or 9 (the same as the system setup utility Internal Audio IRQ)
DMA Channel :	1

Hibernation (SUSTODSK.EXE)

Hibernation, one of the new system feature, cuts off all power to the system while the user isn't using the system. With this feature, the user can expect increased operating time. Hibernation provides the perfect solution for preserving information during low power, battery operation.

Note Backup the data on your system before running SUSTODSK.EXE

After running SUSTODSK, run FDISK.EXE to remove the pre-installed MS-DOS partition and then reinstall the MS-DOS partition. If you do not remove the old MS-DOS partition, Hibernation will not work properly and data may be lost.

After running SUSTODSK/A, 42 MB of hard disk space is reserved for use by the Hibernation feature and the user cannot use this area.

If you use SUSTODSK/F instead, the system automatically adjusts the file size according to the main memory size and may use more HDD space than using SUSTODSK/A. SUSTODSK/F

runs under the operating system using DOS FAT only. Using this option, you do not need to run FDISK.EXE; instead, any time you change the main memory size, you need to run SUSTODSK/F again.

SUSTODSK.EXE Options

/D Select Rest to Disk or File: current system status will be saved in the HDD space or in a hidden file(HIB_FILE) for the Hibernation feature.

/R Select Rest to RAM: current system status will be saved to RAM.

/A Allocate the last 42 MB on the hard disk for Rest to Disk: makes room for the Hibernation feature on the hard disk drive.

/F Create the reserved file(HIB_FILE) on the hard disk for Rest to File: makes a hidden file for use by the Hibernation feature.

/M De-allocate hard disk space, return to maximum size: remove the space on the HDD that was reserved for the Hibernation feature.

Warning **Because of the high possibility of loss of data, this procedure is to be followed by qualified personnel only.**

Using SUSTODSK/A to set the hard disk space for the Hibernation feature

1 Insert the diskette into the A drive and, at the MS-DOS prompt, type:

```
A: [Enter]

SUSTODSK/A [Enter]
```

2 Turn the system power off after execution.

3 Turn the system power back on and remove the MS-DOS partition using FDISK.EXE. Type:

```
FDISK
```

4 Create a MS-DOS partition with a total space of 42 MB.

5 Exit from FDISK.

6 Reboot the system and re-install MS-DOS files using MS-DOS diskettes.

7 When you finish,insert the System Utility diskette into the FDD and at the A:\> prompt, type:

```
SUSTODSK/D [Enter]
```

Your system is now set to use the Hibernation feature to save the system status into the Hibernation space.

Using SUSTODSK/F to create a hidden file for the Hibernation feature

1 Insert the System Utility Diskette into the A drive and, at the MS-DOS prompt, type:

```
A: [Enter]

SUSTODSK/F [Enter]
```

2 Turn the system power off and then back on. Hibernation can now save the system status into the hidden file, as necessary.

If unused HDD space is smaller than memory size plus 2 MB, SUSTODSK/F will not operate properly and the system will ignore the command.

Using SUSTODSK/R to change the Hibernation feature to RAM

1 Insert the System Utility Diskette into the A drive and, at the MS-DOS prompt, type:

```
A: [Enter]

SUSTODSK/R [Enter]
```

2 Turn the system power off and then back on. Hibernation can now save the system status into RAM.

Using SUSTODSK/D to set the Hibernation feature to the HDD space or File

1 Insert the System Utility Diskette into the A drive and, at the MS-DOS prompt, type:

```
A: [Enter]

SUSTODSK/D [Enter]
```

2 Turn the system power off and then back on. Hibernation can now save the system status to the 42 MB allocated for the Hibernation feature by SUSTODSK/A or it will save the data in the hidden file created by SUSTODSK/F.

Note If "Modem Ring Wakeup" function is enabled, then the system will be automatically REST to RAM.

Using SUSTODSK/E to erase the HIB_FILE

1 Insert the System Utility Diskette into the A drive and, at the MS-DOS prompt, type:

```
A: [Enter]

SUSTODSK/E [Enter]
```

2 Turn the system power off and then back on. This operation erases the hidden file and causes Hibernation to save the system status to RAM or to the HDD space.

Using SUSTODSK/M to remove the HDD space allocation

1 Insert the System Utility Diskette into the A drive and, at the MS-DOS prompt, type:

```
A: [Enter]

SUSTODSK/D [Enter]
```

2 Turn the system power off and then back on. Hibernation will now save the system status to RAM or the hidden file.

Technical Specifications

Technical Specifications

Table C-1. Technical Specifications

Item	Standard	Optional
Processor	Intel Pentium P54C-75 MHz or P54LM-90 MHz	
Memory	8 MB	8, 16 ,32 MB Memory Cards
Display	VGA LCDs: Model C - Passive DSTN Color LCD Model T - Active Color TFT LCD	External VGA and SVGA Display
Storage Device	FDD: 1.44 MB, 3.5" HDD: Removable 2.5"	HDD Options: 340, 540 MB
Keyboard	84 Keys, 8 Hot Keys	PS/2 Type 101 Keyboard
Pointing Device	Integrated Trackball	PS/2 or Serial Pointing Devices
Power Management	Full On, Doze, Standby, REST, APM Compliant	
Expansion Port	200 Pin AT BUS	
PCMCIA	1 Type II Slot and 1 Type III Slot	
Digital Audio	*Mono[maximum 44.1KHz] sound Recording and Playback *FM Synthesizer included (Yamaha YMF3812 register compatible-OPL2) 3.5mm phone jack for external Headphone 3.5mm phone jack for external condencer microphone	
Serial I/O	1 Serial Port (9 Pin)	

Item	Standard	Optional
Infrare LED	Infrared Led Port (COM2)	
Parallel I/O	1 Parallel Port (25 Pin) ECP mode and EPP mode support	
Battery	NiMH 2700 mAh Typical Use - 2 hours	
Weight	Model C - 6.1 lbs Model T - 6.2 lbs.	
Dimension	11.3 x 8.94 x 2.23 inch	

Communication Ports

The following table contains the default assignments of the COM ports.

Table C-2. Communication Ports

Device	Communication Port	Address	Interrupt Line
Serial Port	COM1	3F8 H	IRQ 4
PCMCIA Socket	COM1 COM2 COM3 COM4	3F8 H 2F8 H 3E8 H 2E8 H	IRQ 4 IRQ 3 IRQ 5 or IRQ4 IRQ 5 or IRQ3

Operating Environment

Table C-3. Operating Environment

Item	Operating	Non-Operating
Temperature	5°C to 35°C	-5°C to 50°C
Humidity (non-condensing)	20% to 80%	5% to 95%
Shock	5G, 11msec	50G, 11msec
Vibration 5 to 60 Hz	0.5G	1.0G

Troubleshooting

Introduction

In the event you encounter a situation where you suspect that the notebook is not performing correctly, the procedures supplied in this chapter are designed to help you identify and correct possible problems. Follow the steps outlined in this section and in most cases you will be able to identify the source of the problem. Sometimes you will perform diagnostic steps, other times you will have the notebook perform them for you.

As you go through the steps, watch and listen. Your notebook communicates with you in three basic methods:

- Screen Messages
- Indicator Lights on the LED Panel
- Sounds

It's a good idea to write down anything you see on the screen, even if it doesn't seem to make sense. Even strange symbols or gibberish might provide useful information to a service engineer if you find that you must seek technical assistance. Also note:

- Which indicator lights are on?
- Which indicator lights are off?
- Do any of the indicator lights blink?
- What color are the indicator lights?

Preliminary Procedure

Does the notebook respond at all when you turn it on? If little or nothing seems to happen when you push the power switch on, perform the following:

- The battery may be dead. Connect the system to AC or install a fully charged battery.
- If already connected to AC and the problem persists check to insure that the power on indicator of the AC adapter is lit. If not, check the AC Adapter's power cord and wall outlet for power.
- If the indicator on the AC adapter is dim, a power drop (brown out) may have occurred. If this is the case, unplug the power cord from the wall outlet and wait several seconds before plugging it back into the wall outlet.
- Make sure the DC plug is plugged into the DC-In connector.
- If you have been using an external display, printer, or other attachments, disconnect them from the notebook's ports temporarily.
- Push the power switch on.

The first indication of normal operation is the indicator lights on the system. The Power LED should come on as soon as power is applied. If the notebook still appears dead, a faulty AC Adapter is likely. Contact your dealer's service representative for further assistance.

Startup Sequence

This notebook takes about 5 seconds to test itself and load the operating system each time it is turned on. If all is proceeding normally, the process is entirely automatic.

You should familiarize yourself with the sights and sounds of normal operation. If at some later time you suspect a malfunction, a change in these indicators can be an important clue as to the cause of the problem. The process is as follows:

- You will hear the hard disk as it comes up to rotational speed.
- The hard disk and diskette drives both make small buzzing and clicking sounds briefly, even if no diskette is in the drive.
- The BIOS tests them for functionality as well as for the presence of a disk containing a boot sector.

In the normal sequence, a series of messages report the progress of the automatic Self Test procedure. When completed successfully, the notebook executes the boot procedure and loads the appropriate software.

POST Error Messages

The Power On Self Test (POST) is run every time the notebook is turned on. The test, or portions of it, are also run when the system is reset. These tests determine whether the most basic parts of the notebook are functioning. The self-test reports two kinds of information: STATUS and ERRORs.

STATUS reports require no action on your part. However, if ERRORs are also reported, you should take note of any status information displayed.

Generally, detected errors are either transient and do not reappear if you reset the system, or they are fatal and require you to take the system to a qualified service center. If the self test reports errors when you first use the notebook immediately after adding or removing an option, verify that the installation or removal procedures have been performed correctly.

- If the self test reports errors after a power failure (loss of power), brown-out (power reduction), or other electrical disturbance such as a thunderstorm, try resetting the system to see whether the errors disappear. If they do not recur, they may have been transient. If errors reappear, take the system to an authorized service center for service.

Keyboard Test

If you press a key and nothing happens, or you get unexpected results:

- Make sure the software you are using is not remapping the keyboard. Remapping involves reassigning the meaning of each key. Refer to your software's documentation.
- If the problem persists, contact your dealer for assistance.

LCD Test

If you encounter problems with the LCD display, do the following:

- Adjust the brightness control.
- Refer to the documentation for the application program you are using to determine if the software is causing the problem.
- Confirm that you have selected the LCD display by pressing **[Fn]** + **[CRT/LCD]**.

- If you are still unable to resolve the problem, contact your dealer for assistance.

External Display

If you have connected an external video monitor and it does not respond correctly, perform the following:

- Make sure you're using a VGA compatible monitor.
- If the monitor is attached to the VGA port, check the cable for a firm connection to both the notebook and the monitor.
- Check the monitor's power source. Ensure that the monitor is securely connected to a live power source.
- Press the **[Fn]** + **[CRT/LCD]** key combination to direct the video display to the external monitor.
- Examine the problem solving section of the monitor's user manual to determine if the fault is in the monitor.
- If you are still unable to resolve the problem, contact your dealer for assistance.

Note When you connect the external CRT monitor to the system,
1. If some CRT monitors display a horizontal line on the screen when the system enters Standby mode, power off the CRT monitor to protect screen damage.
2. If some CRT monitors do not display any data on the screen after the system comes back to the Full On mode from the Standby mode, power off the CRT monitor and then power it on to restore the display.

Parallel Port Test

The simplest way to check the parallel port is to plug a parallel printer into the port and print something. To do this, when there is any information on the screen, press the **[PrtSc]** key. Whatever is on the screen should print. (Some printers may not reproduce the same symbols or graphics characters that appear on the screen, but the printable ASCII character set should be the same.)

Serial Port Test

As with the Parallel Port test, the simplest way to check the serial port is to plug a serial printer in and print something.

Software Errors

If the system appears to boot normally but fails to run your application program successfully, the problem may be a software error. Application programs usually have their own error messages that tell you when something is not working correctly.

If you are using a program and an error message appears on the screen, check the software manual's list of error messages. If the software manual fails to produce an explanation, check the Error Messages section in the MS-DOS manual.

Sometimes a serious error causes the application program to crash, and the notebook may lose even the ability to display an error message. In such cases, the program may stop and the MS-DOS prompt may reappear unexpectedly.

Sometimes a fault program may damage the portion of MS-DOS that is loaded into working memory. If this happens, the keyboard may lock, in which case you will have to shut the system off and restart.

Power Cord Requirement

The power cord packed with the SENS 800 meets the requirements of the country in which the computer was purchased. If the SENS 800 is used in a different country, you must use a power cord that is approved in that country.

The appliance coupler (the connector mating to the computer) must be capable of mating with a CEE22/IEC 320 appliance inlet.

U.S./Canada

- The power cord must be UL listed and CSA certified.
- The minimum specifications for the flexible cord are:
- No. 18 AWG
- Type SV
- 3-Conductor
- The power cord must have a current capacity of at least 7A.
- The attachment plug must be an earth-grounding type with a NEMA 5-15P (15A, 125V) or NEMA6-15P (15A, 250V) configuration.

Other Countries

The power cord fittings must bear the certification mark of the agency responsible for evaluation in a specific country. Acceptable agencies include:

BSI	United Kingdom
OVE	Austria
NEMKO	Norway
CEBEC	Belgium
DEMKO	Denmark
SETI	Finland
SEMKO	Sweden
UTE	France
EANSW	Australia
SEV	Switzerland
IMQ	Italy
VDE	Germany
KEMA	Netherlands

- The flexible cord must be of a HAR (harmonized) type H05VV-F with a minimum conductor size of .03 $inch^2$ (.75 mm^2)*.
- The cord set must have a current capacity of at least 6 A** and a nominal voltage rating of 120 or 220/240 VAC.

* 1 mm^2 in Australia.
** 10 A in Australia.

Glossary

A

AC Adapter
A power supply which converts AC (Alternating Current) to DC (Direct Current). This current provides external power to the notebook or charges the battery pack.

AC Power
The alternating electronic current in an AC outlet.

AUTOEXEC.BAT
A special purpose batch file. When you turn on your notebook, or restart it by pressing **[Ctrl]** + **[Alt]** + **[Del]**, MS-DOS searches the system disk for the AUTOEXEC.BAT file. If MS-DOS finds the file, it executes the commands located in the file.

B

Base Memory
Up to 640K of memory accessible to MS-DOS. This is also referred to as conventional memory.

Beepcode
A sequence of 3 groups of tones used to indicate an error condition during Power On Self Test (POST). For example, beep-beep pause beep pause beep-beep would indicate error condition 2-1-2.

BIOS
Basic Input/Output System - a collection of routines (usually stored in ROM) that control items such as the video display, disk drives, and keyboard. BIOS is the primary interface between the operating system and the notebook.

Bit
A binary digit and the most basic unit of data that can be recognized and processed by a notebook. A bit either 0 or 1. Bits can be grouped to form larger units of information - nibbles, bytes, or words.

bits per second (bps)
A unit of measurement representing the number of discrete binary digits transmitted by a device in one second.

Buffer
An area in memory in which data is stored temporarily to facilitate output or processing later.

Byte
A sequence of adjacent binary digits operated on as a unit by the notebook. A byte consists of eight bits.

C

Character
A single alphabetic letter, numeric digit, or special symbol such as a comma or decimal point.

CONFIG.SYS
A configuration file that customizes the hardware environment. CONFIG.SYS resides in the root directory and is examined upon startup. It is primarily used to initiate the drivers for peripheral devices that have been added to the notebook.

Central Processing Unit (CPU)
The central processor of the notebook that controls the processing routines, performs arithmetic functions, and maintains memory.

Cursor
A movable symbol on the screen showing the position where you can type a character or make a selection. In text mode, the cursor is a blinking rectangle or underline. In Windows, it is displayed as an arrow.

D

Data
Information of any type, including binary data, hexadecimal numbers, integers, character strings, ASCII characters, etc.

Default
An established value originally set by hardware or software.

Disk
A magnetic disk used to store information.

Diskette
A diskette serves the same purpose as a disk except that it is made of flexible material and is permanently enclosed in a protective jacket.

Dynamic Random Access Memory (DRAM)
A type of RAM comprised of capacitive cells that require periodic refresh to maintain data. While the DRAM is slower than the SRAM its cell is much smaller. This enables the DRAM to be a higher density device.

E

Expanded Memory
Memory that cannot be addressed directly by MS-DOS but must be accessed through the expanded memory manager. It is used directly by application programs.

Extended Memory
Memory beyond 1 megabyte and addressable directly by the processor.

F

Flash ROM
Read only memory that can be erased and re-written many times. It is used in the SENS 800 to store SETUP software, allowing easy upgrades as new versions become available.

G

Graphics
A type of data created from fundamental drawing units such as lines, curves, and so forth.

H

Hard Disk Drive (HDD)
A unit that consists of magnetic disks, and a device for storing and retrieving data from the disks.

Hardware
The physical components of a notebook.

Hertz (Hz)
A unit of frequency equal to one cycle per second.

I

Input/Output (I/O)
Data transferred between the microprocessor's internal data bus and devices external to that data bus, even though they may be physically inside the notebook.

Interface
An exchange of information between one device and another or the device that makes such exchanges possible.

K

Kilobyte (KB)
1024 bytes.

L

LCD
Liquid Crystal Display.

Light Emitting Diode (LED)
A display technology that uses a particular variety of semiconductor diode that emits light when charged with electricity. LEDs usually give off a red glow, although other colors can be generated as well.

M

MS-DOS
Microsoft Disk Operating System.

N

Nickel Metal Hydride (NiMH)
A rechargeable nickel metal hydride battery.

O

Operating System (OS)
Software that controls program execution, resource allocation, scheduling, input/output control and data management.

P

PCMCIA
Personal Computer Memory Card International Association, a standard for credit card sized memory and I/O devices that plug into the notebook.

Peripheral
A device controlled by the microprocessor that is external to the notebook. Some peripheral devices include video displays, disk drives, and printers.

Pixel
The smallest displayable unit on a monitor or picture tube element.

Port
An access point for data entry or exit.

Power On Self Test (POST)
A series of diagnostic tests that are run each time the notebook's power is turned on.

Prompt
A symbol or message indicating readiness to accept input.

R

RAM
Random Access Memory. A storage medium in which access time is effectively independent of the location of the data. Storage in RAM is temporary and is lost when the power is turned off.

ROM
Read Only Memory. A storage medium in which data is stored permanently and cannot be altered. The data in ROM remains intact even when the power is turned off. ROM is used to store important programs such as the BIOS.

S

Setup
A ROM based utility which allows you to control the default attributes of the SENS 800 each time you turn on the notebook.

Software

Programs such as assemblers, compilers, operating systems, electronic spread sheets, or word processors that instruct the notebook to perform a particular task.

V

Video Graphics Array (VGA)

A display mode that allows graphics to be displayed on a suitable RGB color monitor with a maximum of 640 x 480 pixels of resolution.

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98134-394-009
Rev. 1.1
Printed in Korea